

APPENDIX C

ECOLOGICAL STUDIES

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APPENDIX C – ECOLOGICAL STUDIES

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- ATTACHMENT A Submerged Aquatic Vegetation Sampling Results Memo
- ATTACHMENT B Baltimore Harbor Fisheries Studies Presentation (2003 – 2005)

Table C-5. Cumulative List of Botanical Species Observed at Masonville During Seasonal Surveys Conducted from 2003 through 2004

Scientific Name	Common Name
<i>Bidens</i> sp.	Beggar ticks species
<i>Catalpa speciosa</i>	Northern catalpa
<i>Cercis canadensis</i>	Redbud
<i>Clematis terniflora</i>	Sweet autumn clematis
<i>Eupatorium rugosum</i>	White snakeroot
<i>Hibiscus palustris</i>	Swamp rose mallow
<i>Impatiens capensis</i>	Jewelweed
<i>Iva frutescens</i>	Marsh-elder
<i>Morus alba</i>	White mulberry
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil
<i>Parthenocissus quinquefolia</i>	Virginia creeper
<i>Paulownia tomentosa</i>	Royal paulownia
<i>Phragmites australis</i>	Common reed grass
<i>Phytolacca americana</i>	Pokeweed
<i>Rhus aromatica</i>	Fragrant sumac
<i>Rhus</i> sp.	Sumac species
<i>Rhus typhina</i>	Staghorn sumac
<i>Robinia pseudoacacia</i>	Black locust
<i>Rubus allegheniensis</i>	Blackberry
<i>Rumex crispus</i>	Curly dock
<i>Salix nigra</i>	Black willow
<i>Sassafras albidum</i>	Sassafras
<i>Silene noctiflora</i>	Night-flowering catchfly
<i>Toxicodendron radicans</i>	Poison ivy
<i>Ulmus rubra</i>	Slippery elm
<i>Vitis</i> sp.	Grape species

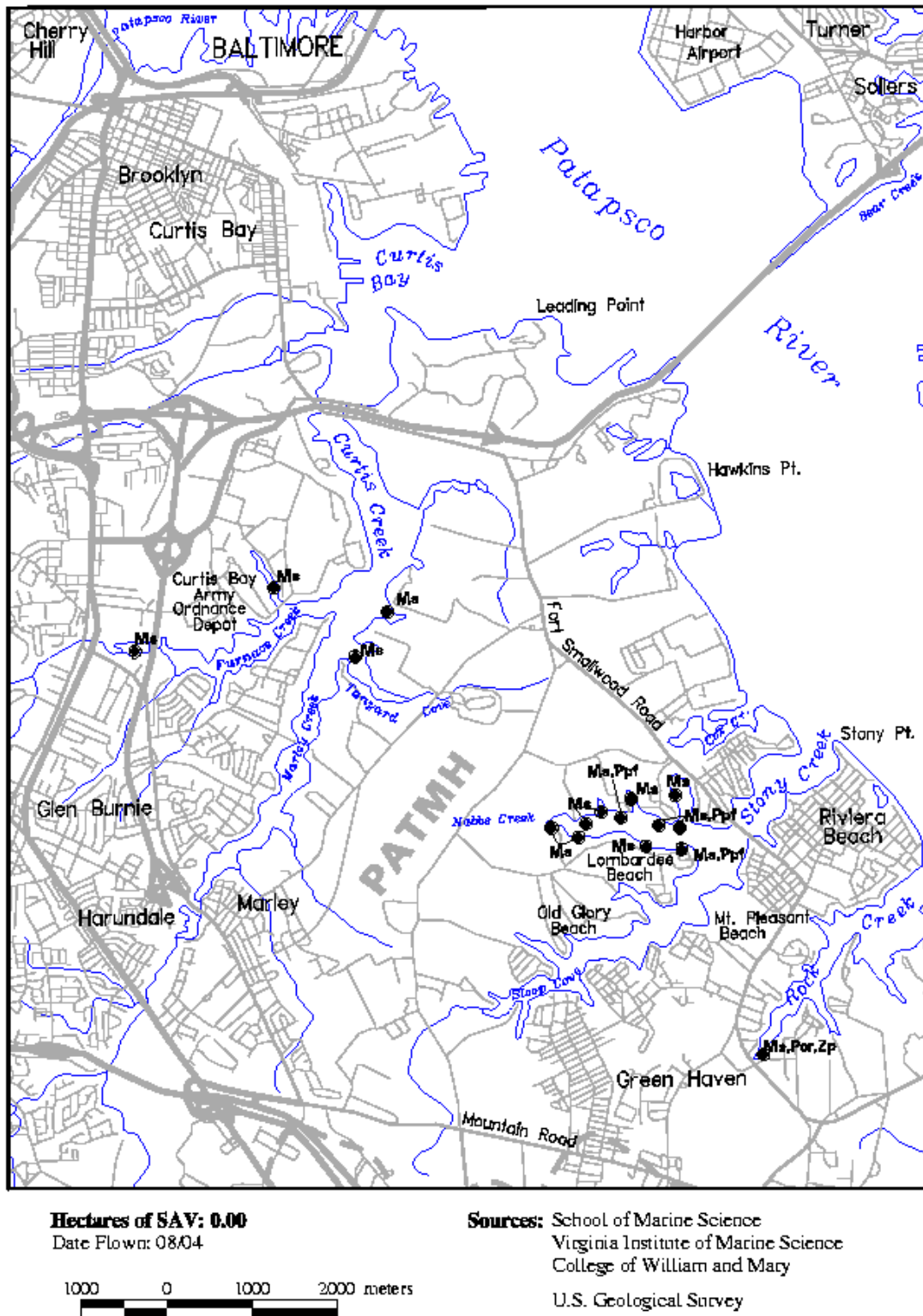


Figure C-1. 1998 Submerged Aquatic Vegetation, Curtis Bay, MD
(Downloaded from VIMS website; Masonville along upper edge of figure)

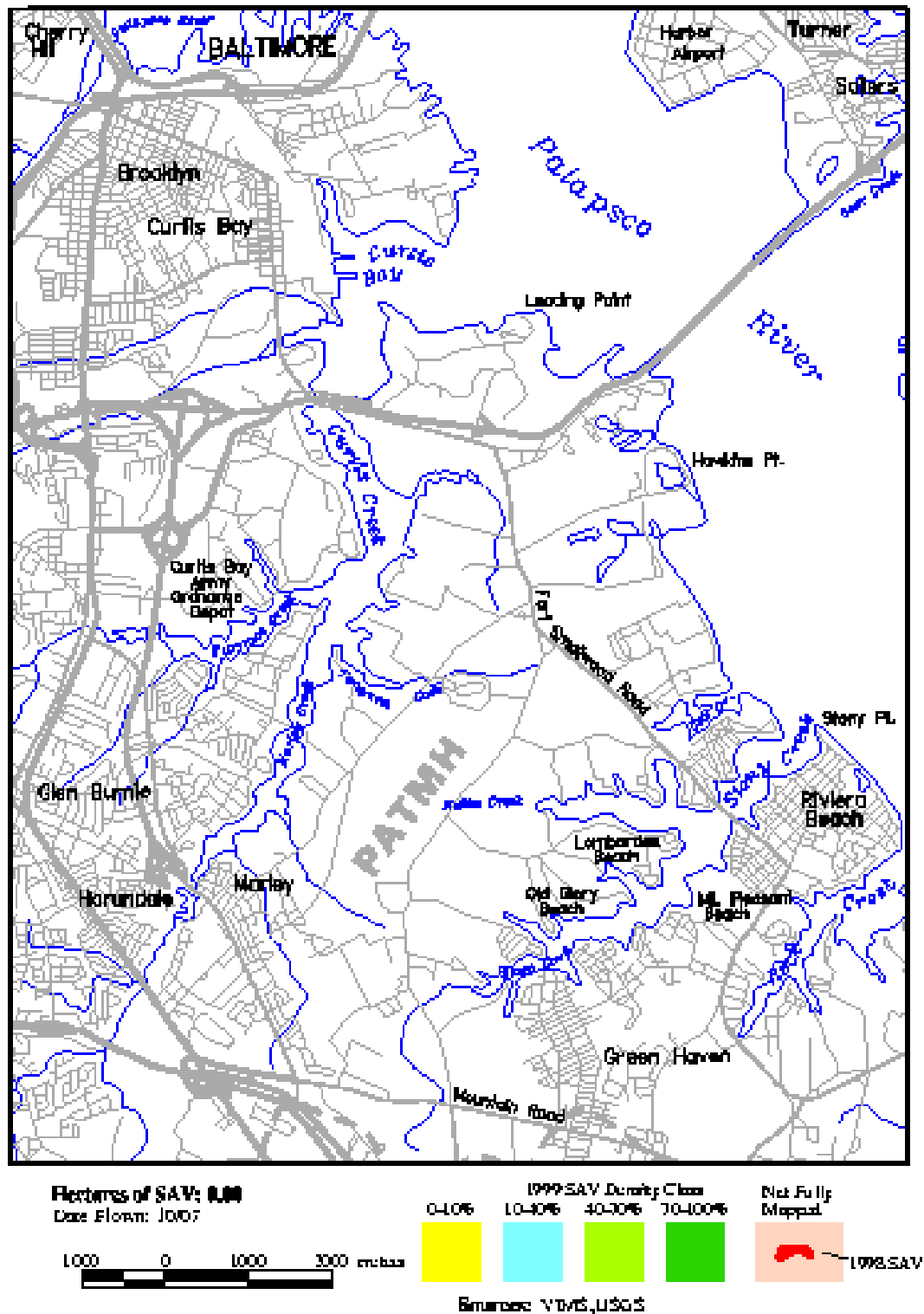


Figure C-2. 1999 Submerged Aquatic Vegetation, Curtis Bay, MD
(Downloaded from VIMS website; Masonville along upper edge of figure)

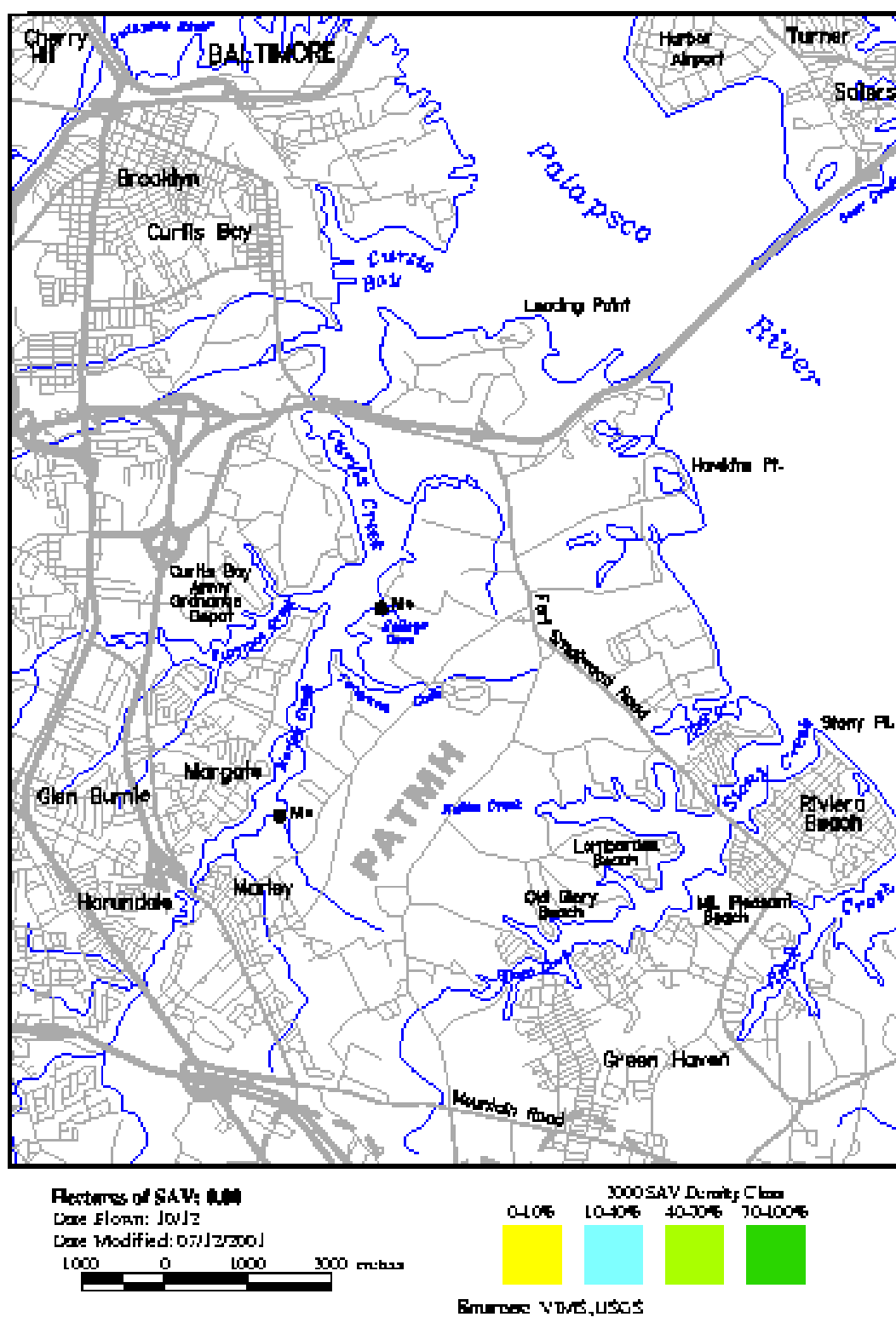


Figure C-3. 2000 Submerged Aquatic Vegetation, Curtis Bay, MD
(Downloaded from VIMS website; Masonville along upper edge of figure)

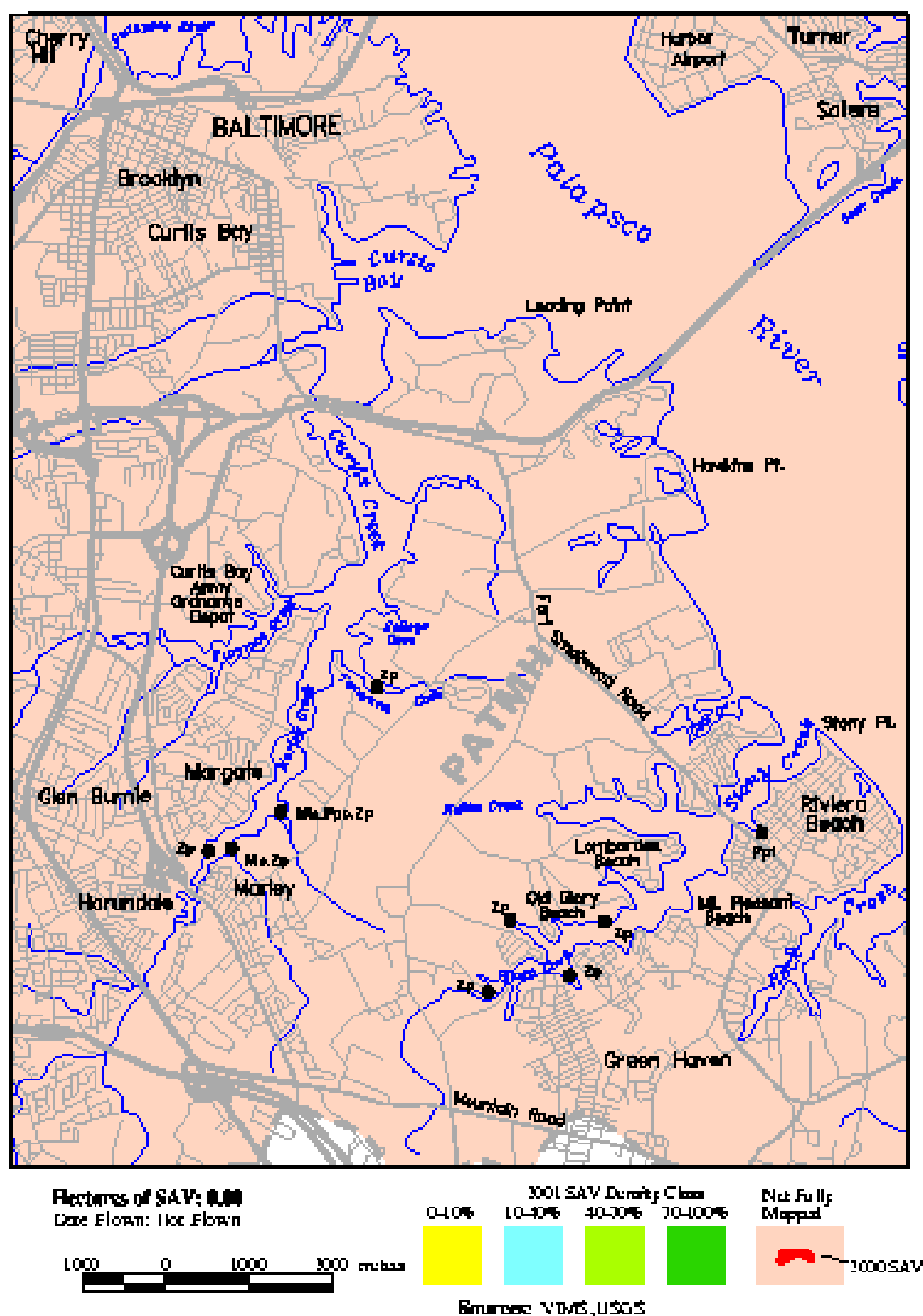


Figure C-4. 2001 Submerged Aquatic Vegetation, Curtis Bay, MD
(Downloaded from VIMS website; Masonville along upper edge of figure)

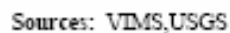


Figure C-5. 2002 Submerged Aquatic Vegetation, Curtis Bay, MD
(Downloaded from VIMS website; Masonville along upper edge of figure)

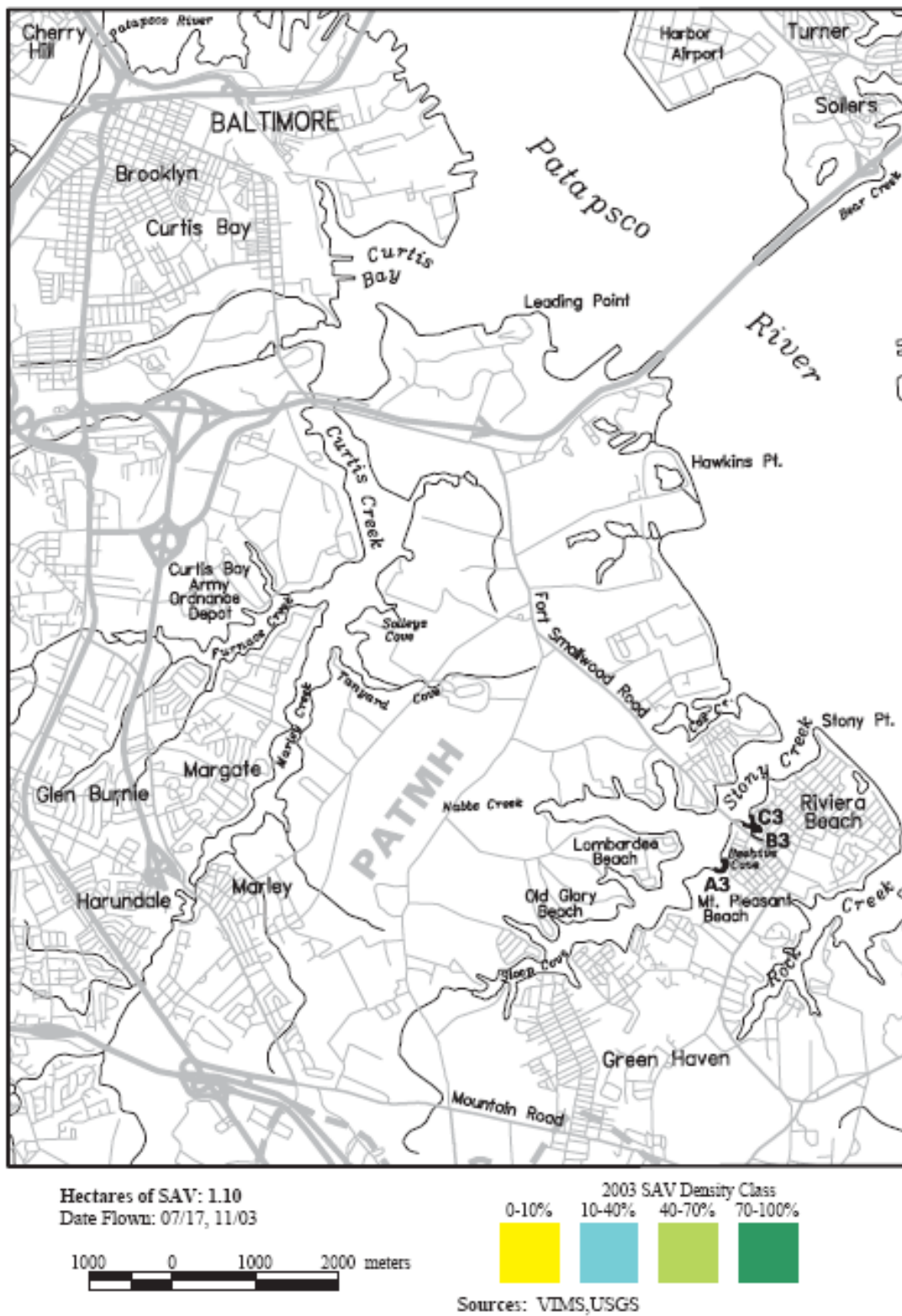


Figure C-6. 2003 Submerged Aquatic Vegetation, Curtis Bay, MD
(Downloaded from VIMS website; Masonville along upper edge of figure)

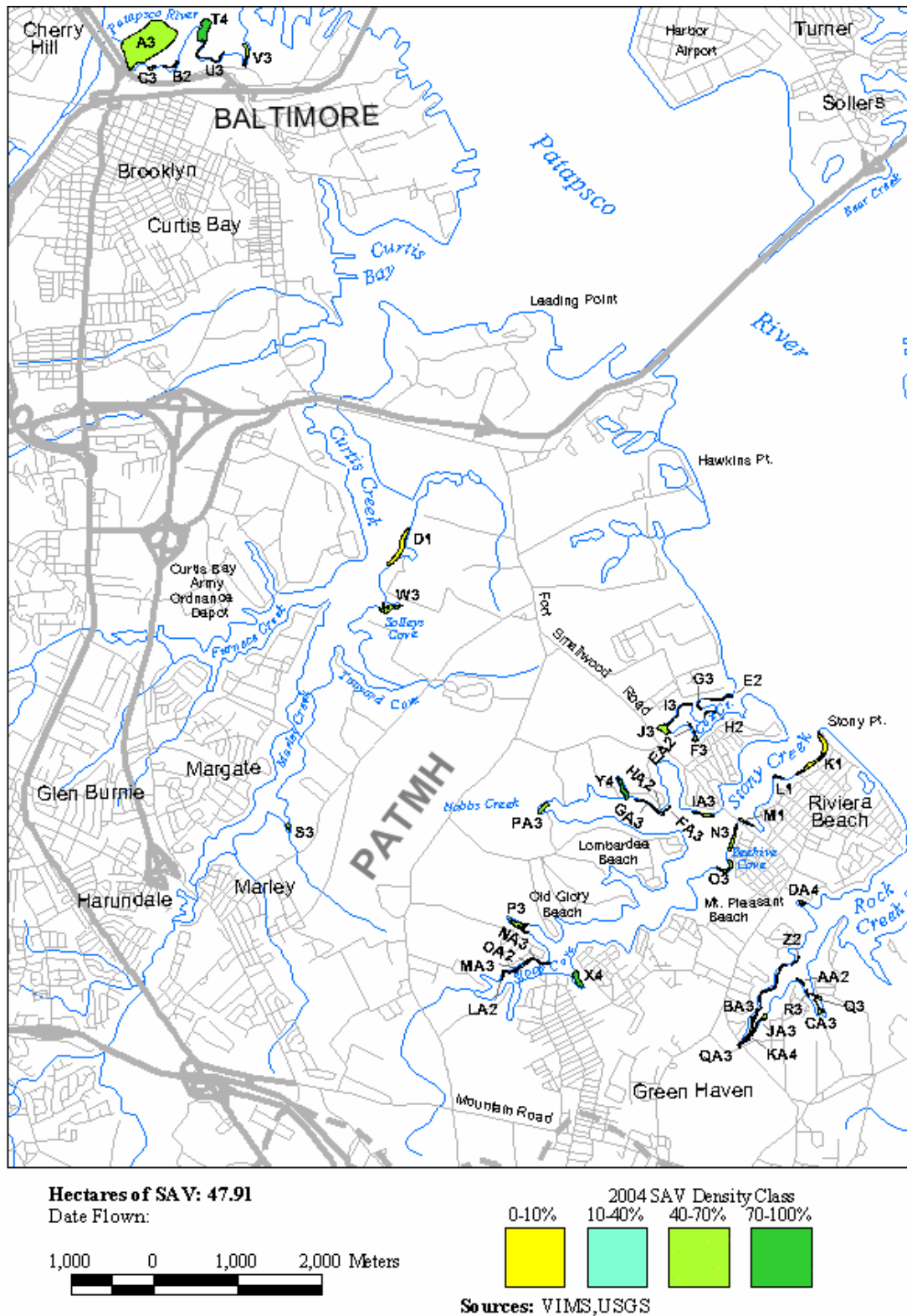


Figure C-7. 2004 Submerged Aquatic Vegetation, Curtis Bay, MD
(Downloaded from VIMS website; Masonville along upper edge of figure)

TABLE C-1. SUMMARY OF THE COMPOSITION AND ABUNDANCE OF FISHERIES COLLECTIONS AT THOMS COVE, BP-FAIRFIELD, SOLLERS POINT, WET BASIN, AND KURT IRON STATIONS, BALTIMORE HARBOR (AUGUST 2005)
MASONVILLE DREDGED MATERIAL CONTAINMENT FACILITY, BALTIMORE HARBOR, MARYLAND

COMMON NAME	SCIENTIFIC NAME	THOMS COVE				BP-FAIRFIELD		SOLLERS POINT				WET BASIN		KURT IRON	
		GILLNET		SEINE		SEINE		GILLNET		SEINE		GILLNET		GILLNET	
		TC-G1A	TC-G1B	TC-S1	TC-S2	BP-S1	BP-S2	SP-G1A	SP-G1B	SP-S1	SP-S2	WB-G1	WB-G2	KI-G1	KI-G2
Hickory Shad	<i>Alosa mediocris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atlantic Menhaden	<i>Brevoortia tyrannus</i>	153	115	5	312	0	0	13	8	0	0	21	4	13	35
Weakfish	<i>Cynoscion regalis</i>	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Gizzard Shad	<i>Dorosoma cepedianum</i>	5	6	0	0	0	0	22	9	0	0	2	0	2	0
Herring		0	0	7	0	0	0	0	0	0	0	0	0	0	0
Banded Killifish	<i>Fundulus diaphanus</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Striped Killifish	<i>Fundulus majalis</i>	0	0	1	0	2	3	0	0	0	0	0	0	0	0
Channel Catfish	<i>Ictalurus punctatus</i>	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Spot	<i>Leiostomus xanthurus</i>	67	97	1	0	0	0	122	234	0	0	131	198	114	147
Striped Bass	<i>Morone saxatilis</i>	9	23	4	1	6	5	7	2	3	0	6	9	3	1
White Perch	<i>Morone americana</i>	45	92	64	6	67	42	54	18	14	1	8	26	28	20
Inland Silverside	<i>Menidia beryllina</i>	0	0	12	10	0	0	0	0	0	0	0	0	0	0
Atlantic Silverside	<i>Menidia menidia</i>	0	0	157	182	245	15	0	0	36	12	0	0	0	0
Summer Flounder	<i>Paralichthys dentatus</i>	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Yellow Perch	<i>Perca flavescens</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Bluefish	<i>Pomatomus saltatrix</i>	13	4	0	0	0	0	0	3	0	0	3	1	1	1
Blue Crab	<i>Callinectes sapidus</i>	16	3	0	0	0	0	20	6	0	0	1	1	0	1
TOTAL ABUNDANCE		308	345	252	511	320	65	239	281	53	13	172	240	161	207
TOTAL NUMBER OF SPECIES		7	9	9	5	4	4	7	8	3	2	7	7	6	8

TABLE C-2. FISH SPECIES CAUGHT BY SEASON, EQUIPMENT, AND STATION AT MASONVILLE FROM 2003 THROUGH 2005
MASONVILLE DREDGED MATERIAL CONTAINMENT FACILITY, BALTIMORE HARBOR, MARYLAND

FAMILY	SCIENTIFIC NAME	STATION COMMON NAME	YEAR 2003					SPRING 2004					FALL 2004					SPRING 2005		SUMMER 2005				
			SEINE		GILLNET		TRAWL	SEINE		GILLNET		TRAWL	SEINE		GILLNET		TRAWL	GILLNET		GILLNET				
			M-S1	M-G1	M-G2	M-T1	M-T2	M-S1	M-G1	M-G2	M-T1	M-T2	M-S1	M-G1	M-G2	M-T1	M-T2	WB-G1	KL-G1	WB-G1	WB-G2	KL-G1	KL-G2	
Anguillidae	<i>Anguilla rostrata</i>	American Eel	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Engraulidae	<i>Anchoa mitchilli</i>	Bay Anchovy	--	--	--	--	--	--	--	--	8	--	658	--	--	--	--	--	--	--	--	--	--	
Clupeidae	<i>Alosa aestivalis</i>	Blueback Herring	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Clupeidae	<i>Alosa mediocris</i>	Hickory Shad	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--		
Clupeidae	<i>Alosa pseudoharengus</i>	Alewife	--	--	--	--	--	2	1	--	--	--	1	--	--	--	--	--	--	--	--	--		
Clupeidae	<i>Alosa sapidissima</i>	American Shad	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Clupeidae	<i>Brevoortia tyrannus</i>	Atlantic Menhaden	1	30	69	--	--	--	106	156	--	--	--	157	216	--	--	55	90	21	4	13	35	
Clupeidae	<i>Dorosoma cepedianum</i>	Gizzard Shad	5	1	9	--	--	--	4	4	--	--	1	24	46	--	1	--	7	2	--	2	--	
Cyprinidae	<i>Cyprinus carpio</i>	Common Carp	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--		
Cyprinidae	<i>Notropis hudsonius</i>	Spottail Shiner	39	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Catostomidae	<i>Catostomus commersoni</i>	White Sucker	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Ictaluridae	<i>Ameiurus nebulosus</i>	Brown Bullhead	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--		
Ictaluridae	<i>Ictalurus punctatus</i>	Channel Catfish	--	--	--	--	--	1	1	--	--	--	5	7	--	--	--	--	--	1	--	1		
Esocidae	<i>Esox niger</i>	Chain pickerel	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--		
Atherinidae	<i>Menidia menidia</i>	Atlantic Silverside	224	--	--	--	--	216	--	--	--	--	77	--	--	--	--	--	--	--	--	--		
Fundulidae	<i>Fundulus diaphanus</i>	Banded Killifish	--	--	--	--	--	6	--	--	--	--	19	--	--	--	--	--	--	--	--	--		
Fundulidae	<i>Fundulus heteroclitus</i>	Mummichog	--	--	--	--	--	54	--	--	--	--	15	--	--	--	--	--	--	--	--	--		
Fundulidae	<i>Fundulus majalis</i>	Striped Killifish	3	--	--	--	--	--	1	--	--	--	4	--	--	--	--	--	--	--	--	--		
Moronidae	<i>Morone americana</i>	White Perch	474	140	413	201	247	137	209	152	3	6	12	233	293	9	17	108	144	8	26	28	20	
Moronidae	<i>Morone saxatilis</i>	Striped Bass	878	--	12	--	2	10	34	53	2	2	4	39	46	1	1	21	7	6	9	3	1	
Centrarchidae	<i>Lepomis gibbosus</i>	Pumpkinseed	6	--	--	--	--	4	1	--	--	--	12	--	--	--	--	--	--	--	--	--		
Centrarchidae	<i>Micropterus salmoides</i>	Largemouth Bass	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Percidae	<i>Perca flavescens</i>	Yellow Perch	4	--	--	--	--	--	--	--	--	--	--	--	--	--	6	3				1		
Pomatomidae	<i>Pomatomus saltatrix</i>	Bluefish	--	--	1	--	--	--	--	--	--	--	1	2	--	--	--	--	--	3	1	1	1	
Sciaenidae	<i>Leiostomus xanthurus</i>	Spot	--	--	--	--	--	--	1	--	--	--	32	22	--	--	--	--	--	131	198	114	147	
Gobiidae	<i>Gobiosoma boscii</i>	Naked Goby	11	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--		
Paralichthyidae	<i>Paralichthys dentatus</i>	Summer Flounder	--	--	--	--	--	--	--	--	--	--	1	3	--	--	--	--	--	--	--	--		
Portunidae	<i>Callinectes sapidus</i>	Blue Crab	--	1	2	2	--	--	1	1	2	--	6	1	--	1	3	1	1	1		1		

TABLE C-3. CUMULATIVE LIST OF BENTHIC SPECIES COLLECTED BY SEASONAL DENSITY AND STATION NUMBER

MASONVILLE DREDGED MATERIAL CONTAINMENT FACILITY, BALTIMORE HARBOR, MARYLAND

ORDER	FAMILY	SCIENTIFIC NAME	SUMMER 2003				SPRING 2003	SUMMER 2004					FALL 2004	SUMMER 2005		
			M-B1	M-B2	M-B3	M-B4	M-B4	M-B5	M-B6	M-B7	M-B8	M-B9	M-B4	MSNSURF05-3	MSNSURF05-4	WBSURF05-1
Cnidaria	--	<i>Diadumene leucolela</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cnidaria	--	<i>Edwardsia elegans</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbellaria	--	<i>Turbellaria sp.</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nemertinea	--	<i>Carinoma tremaphorus</i>	--	6.80	6.80	--	--	--	6.80	6.80	6.80	6.80	--	6.80	--	--
Nemertinea	--	<i>Lineus bicolor</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	13.60
Annelida	Polychaeta	<i>Eteone heteropoda</i>	6.80	--	--	--	13.60	--	--	--	--	6.80	--	--	13.60	6.80
Annelida	Polychaeta	<i>Heteromastus filiformis</i>	--	--	--	--	27.20	6.60	54.40	74.80	34.00	142.80	54.40	20.40	13.60	--
Annelida	Polychaeta	<i>Hobsonia florida</i>	--	--	--	--	6.80	--	95.20	6.80	27.20	95.20	6.80	13.60	190.40	--
Annelida	Polychaeta	<i>Marenzelleria viridis</i>	108.80	244.80	2,386.80	--	--	61.20	149.60	95.20	244.40	108.80	--	176.80	95.20	--
Annelida	Polychaeta	<i>Neanthes succinea</i>	6.80	40.80	68.00	--	--	--	20.40	258.40	142.80	13.60	6.80	27.20	61.20	--
Annelida	Polychaeta	<i>Nereididae</i>	--	--	6.80	--	--	--	--	--	--	--	--	--	--	--
Annelida	Polychaeta	<i>Polydora cornuta</i>	6.80	--	27.20	--	--	--	--	13.60	122.40	--	--	108.80	61.20	--
Annelida	Polychaeta	<i>Streblospio benedicti</i>	2,876.40	1,033.60	292.40	333.20	1,999.20	578.00	809.20	2,046.80	2,556.80	2,026.40	693.60	3,964.40	1,550.40	3,175.60
Annelida	Oligochaeta	<i>Tubificoides spp.</i>	707.20	1,870.00	1,346.40	1,156.00	1,978.80	--	102.00	251.60	95.20	1,210.40	163.20	448.80	741.20	367.20
Gastropoda	--	<i>Littoridinops tenuipes</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gastropoda	--	<i>Cratena pilata</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bivalvia	--	<i>Geukensia demissa</i>	--	--	--	--	--	--	6.80	6.80	--	--	--	--	--	--
Bivalvia	--	<i>Macoma balthica</i>	761.60	584.80	312.80	333.20	81.60	6.80	156.40	115.60	13.60	88.40	--	20.40	54.40	74.80
Bivalvia	--	<i>Macoma mitchelli</i>	27.20	40.80	47.60	20.40	156.40	81.60	251.60	265.20	40.80	353.60	54.40	13.60	95.20	--
Bivalvia	--	<i>Mulinia lateralis</i>	6.80	6.80	--	--	--	--	--	--	--	--	--	--	--	--
Bivalvia	--	<i>Mya arenaria</i>	27.20	40.80	61.20	--	--	--	6.80	--	--	--	--	--	--	--
Bivalvia	--	<i>Mytilopsis leucophaea</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bivalvia	--	<i>Rangia cuneata</i>	--	--	--	--	34.00	13.60	142.80	224.40	34.00	40.80	27.20	61.20	129.20	--
Crustacea	Amphipoda	<i>Ameroculodes spp. Complex</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Crustacea	Amphipoda	<i>Apocorophium lacustre</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Crustacea	Amphipoda	<i>Gammarus daiberi</i>	--	--	--	--	--	--	--	--	--	6.80	--	--	--	--
Crustacea	Amphipoda	<i>Leptocheirus plumulosus</i>	95.20	1,883.60	1,448.40	27.20	1,652.40	938.40	2,747.20	5,120.40	1,400.80	4,780.40	6.80	--	720.80	--
Crustacea	Amphipoda	<i>Melita nitida</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Crustacea	Isopoda	<i>Cyathura polita</i>	6.80	40.80	516.80	6.80	--	6.80	74.80	6.80	13.60	88.40	--	--	13.60	--
Crustacea	Isopoda	<i>Edotea triloba</i>	--	34.00	68.00	--	--	13.60	47.60	278.80	20.40	340.00	--	--	6.80	--
Crustacea	Mysidacea	<i>Neomysis americana</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diptera	--	<i>Chironomidae pupae</i>	--	--	--	--	--	--	--	--	--	--	--	6.80	6.80	--
Diptera	--	<i>Chironomidae larvae</i>	6.80	--	--	6.80	6.80	6.80	--	--	--	--	54.40	442.00	136.00	--

**TABLE C-4. CUMULATIVE LIST OF AVIAN SPECIES OBSERVED AT MASONVILLE
MASONVILLE DREDGED MATERIAL CONTAINMENT FACILITY, BALTIMORE HARBOR, MARYLAND**

FAMILY	SCIENTIFIC NAME	COMMON NAME	MONTH AND YEAR							
			Aug-03	May-04	Jul-04	Oct-04	Feb-05	Jun-05	Aug-05	Sep-05
Gaviidae	<i>Gavia immer</i>	Common Loon		X						
Podicipedidae	<i>Podilymbus podiceps</i>	Pied-Billed Grebe							X	
Phalacrocoridae	<i>Phalacrocorax auritus</i>	Double-crested Cormorant	X		X	X		X	X	X
Ardeidae	<i>Ardea herodias</i>	Great Blue Heron	X	X	X	X		X	X	X
Ardeidae	<i>Ardea alba</i>	Great Egret	X					X	X	X
Ardeidae	<i>Butorides virescens</i>	Green Heron	X	X	X			X	X	
Ardeidae	<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	X					X		X
Ardeidae	<i>Nyctanassa violacea</i>	Yellow-crowned Night-Heron								X
Cathartidae	<i>Coragyps atratus</i>	Black Vulture	X							
Cathartidae	<i>Cathartes aura</i>	Turkey Vulture						X		X
Anatidae	<i>Branta canadensis</i>	Canada Goose		X		X				X
Anatidae	<i>Cygnus olor</i>	Mute Swan		X	X	X				
Anatidae	<i>Anas strepera</i>	Gadwall					X			
Anatidae	<i>Anas americana</i>	American Wigeon								X
Anatidae	<i>Anas rubripes</i>	American Black Duck								X
Anatidae	<i>Anas platyrhynchos</i>	Mallard	X	X	X	X	X	X	X	X
Anatidae	<i>Anas crecca</i>	Green-winged Teal				X	X			
Anatidae	<i>Aythya valisineria</i>	Canvasback					X			
Anatidae	<i>Aythya collaris</i>	Ring-necked Duck					X			
Anatidae	<i>Aythya affinis</i>	Lesser Scaup					X	X		
Anatidae	<i>Bucephala albeola</i>	Bufflehead	X	X						
Anatidae	<i>Mergus merganser</i>	Common Merganser					X			
Anatidae	<i>Oxyura jamaicensis</i>	Ruddy Duck					X			
Accipitridae	<i>Pandion haliaetus</i>	Osprey	X					X	X	X
Accipitridae	<i>Haliaeetus leucocephalus</i>	Bald Eagle		X	X	X				X
Accipitridae	<i>Circus cyaneus</i>	Northern Harrier								X
Accipitridae	<i>Accipiter striatus</i>	Sharp-shinned Hawk								X
Accipitridae	<i>Accipiter cooperii</i>	Cooper's Hawk								X
Accipitridae	<i>Buteo lineatus</i>	Red-shouldered Hawk								X
Accipitridae	<i>Buteo jamaicensis</i>	Red-tailed Hawk					X			
Phasianidae	<i>Phasianus colchicus</i>	Ring-necked Pheasant			X			X		
Rallidae	<i>Fulica Americana</i>	American Coot					X			

TABLE C-4. CONTINUED
MASONVILLE DREDGED MATERIAL CONTAINMENT FACILITY, BALTIMORE HARBOR, MARYLAND

FAMILY	SCIENTIFIC NAME	COMMON NAME	MONTH AND YEAR							
			Aug-03	May-04	Jul-04	Oct-04	Feb-05	Jun-05	Aug-05	Sep-05
Charadriidae	<i>Charadrius vociferous</i>	Killdeer						X	X	X
Scolopacidae	<i>Actitis macularia</i>	Spotted Sandpiper						X	X	
Scolopacidae	<i>Calidris minutilla</i>	Least Sandpiper		X						
Laridae	<i>Larus atricilla</i>	Laughing Gull	X	X	X	X				X
Laridae	<i>Larus delawarensis</i>	Ring-billed Gull					X	X	X	X
Laridae	<i>Larus argentatus</i>	Herring Gull					X	X	X	X
Laridae	<i>Larus marinus</i>	Great Black-backed Gull					X			
Laridae	<i>Larus sp.</i>	Gull sp. (juvenile)	X							
Laridae	<i>Sterna caspia</i>	Caspian Tern							X	X
Laridae	<i>Sterna hirundo</i>	Common Tern							X	
Laridae	<i>Sterna forsteri</i>	Forster's Tern	X							
Laridae	<i>Sterna antillarum</i>	Least Tern						X		
Columbidae	<i>Columba livia</i>	Rock Dove								X
Columbidae	<i>Zenaida macroura</i>	Mourning Dove							X	X
Cuculidae	<i>Coccyus americanus</i>	Yellow-Billed Cuckoo								
Apodidae	<i>Chaetura pelagica</i>	Chimney Swift								X
Alcedinidae	<i>Ceryle alcyon</i>	Belted Kingfisher			X		X		X	X
Picidae	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker								X
Picidae	<i>Picoides pubescens</i>	Downy Woodpecker					X	X		
Picidae	<i>Colaptes auratus</i>	Northern Flicker					X		X	X
Tyrannidae	<i>Sayornis phoebe</i>	Eastern Phoebe								X
Tyrannidae	<i>Tyrannus tyrannus</i>	Eastern Kingbird	X					X	X	
Corvidae	<i>Cyanocitta cristata</i>	Blue Jay						X		
Corvidae	<i>Corvus brachyrhynchos</i>	American Crow	X				X		X	X
Hirundinidae	<i>Tachycineta bicolor</i>	Tree Swallow		X	X					
Hirundinidae	<i>Stelgidopteryx serripennis</i>	Swallow						X		
Hirundinidae	<i>Hirundo rustica</i>	Barn Swallow	X					X	X	
Paridae	<i>Baeolophus bicolor</i>	Tufted Titmouse					X			
Troglodytidae	<i>Thryothorus ludovicianus</i>	Carolina Wren					X	X	X	X
Troglodytidae	<i>Troglodytes aedon</i>	House Wren						X	X	X
Troglodytidae	<i>Cistothorus palustris</i>	Marsh Wren								X
Turdidae	<i>Turdus migratorius</i>	American Robin						X	X	

TABLE C-4. CONTINUED
MASONVILLE DREDGED MATERIAL CONTAINMENT FACILITY, BALTIMORE HARBOR, MARYLAND

FAMILY	SCIENTIFIC NAME	COMMON NAME	MONTH AND YEAR							
			Aug-03	May-04	Jul-04	Oct-04	Feb-05	Jun-05	Aug-05	Sep-05
Mimidae	<i>Dumetella carolinensis</i>	Gray Catbird	X					X	X	X
Mimidae	<i>Mimus polyglottos</i>	Northern Mockingbird					X	X	X	
Sturnidae	<i>Sturnus vulgaris</i>	European Starling						X	X	
Bombycillidae	<i>Bombycilla cedrorum</i>	Cedar Waxwing						X	X	
Parulidae	<i>Vermivora ruficapilla</i>	Nashville Warbler								X
Parulidae	<i>Dendroica petechia</i>	Yellow Warbler						X	X	
Parulidae	<i>Dendroica coronata</i>	Yellow-rumped Warbler					X			
Parulidae	<i>Dendroica palmarum</i>	Palm Warbler								X
Parulidae	<i>Geothlypis trichas</i>	Common Yellowthroat		X	X			X	X	X
Emberizidae	<i>Spizella arborea</i>	American Tree Sparrow					X			
Emberizidae	<i>Spizella pusilla</i>	Field Sparrow					X			
Emberizidae	<i>Passerculus sandwichensis</i>	Savannah Sparrow					X			X
Emberizidae	<i>Passerella iliaca</i>	Fox Sparrow					X		X	
Emberizidae	<i>Melospiza melodia</i>	Song Sparrow					X	X	X	X
Emberizidae	<i>Melospiza georgiana</i>	Swamp Sparrow					X			X
Emberizidae	<i>Zonotrichia albicollis</i>	White-throated Sparrow					X			
Emberizidae	<i>Junco hyemalis</i>	Dark-eyed Junco						X		
Cardinalidae	<i>Cardinalis cardinalis</i>	Northern Cardinal					X	X	X	X
Cardinalidae	<i>Guiraca caerulea</i>	Blue Grosbeak						X	X	
Cardinalidae	<i>Passerina cyanea</i>	Indigo Bunting						X	X	
Icteridae	<i>Dolichonyx oryzivorus</i>	Bobolink								X
Icteridae	<i>Agelaius phoeniceus</i>	Red-winged Blackbird		X	X		X	X	X	X
Icteridae	<i>Quiscalus quiscula</i>	Common Grackle						X	X	
Icteridae	<i>Molothrus ater</i>	Brown-headed Cowbird						X		
Icteridae	<i>Icterus spurius</i>	Orchard Oriole						X	X	
Fringillidae	<i>Carpodacus mexicanus</i>	House Finch	X							
Fringillidae	<i>Carduelis tristis</i>	American Goldfinch						X	X	X
Passerodae	<i>Passer domesticus</i>	House Sparrow								X

Table C-5. Cumulative List of Botanical Species Observed at Masonville During Seasonal Surveys Conducted from 2003 through 2004

Scientific Name	Common Name
<i>Bidens</i> sp.	Beggar ticks species
<i>Catalpa speciosa</i>	Northern catalpa
<i>Cercis canadensis</i>	Redbud
<i>Clematis terniflora</i>	Sweet autumn clematis
<i>Eupatorium rugosum</i>	White snakeroot
<i>Hibiscus palustris</i>	Swamp rose mallow
<i>Impatiens capensis</i>	Jewelweed
<i>Iva frutescens</i>	Marsh-elder
<i>Morus alba</i>	White mulberry
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil
<i>Parthenocissus quinquefolia</i>	Virginia creeper
<i>Paulownia tomentosa</i>	Royal paulownia
<i>Phragmites australis</i>	Common reed grass
<i>Phytolacca americana</i>	Pokeweed
<i>Rhus aromatica</i>	Fragrant sumac
<i>Rhus</i> sp.	Sumac species
<i>Rhus typhina</i>	Staghorn sumac
<i>Robinia pseudoacacia</i>	Black locust
<i>Rubus allegheniensis</i>	Blackberry
<i>Rumex crispus</i>	Curly dock
<i>Salix nigra</i>	Black willow
<i>Sassafras albidum</i>	Sassafras
<i>Silene noctiflora</i>	Night-flowering catchfly
<i>Toxicodendron radicans</i>	Poison ivy
<i>Ulmus rubra</i>	Slippery elm
<i>Vitis</i> sp.	Grape species

ATTACHMENT A

SAV SURVEY MEMO

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TO: Jane Boraczek **LOCATION:** EA – Eastern Shore

FROM: Charles Leasure **LOCATION:** Loveton

SUBJECT: SAV Survey within Footprint of the Proposed Masonville Dredge Material Containment Facility, Middle Branch Patapsco River

The survey was conducted from an open work boat. The survey was limited to areas with 7-8 feet of water, or less. Throughout the survey areas, an iron garden rake was thrown into the water and pulled across the bottom in an effort to bring to the surface any SAV that may be present. SAV presence or absence was noted without use of the rake in areas with shallow water where the bottom could be clearly observed from the boat.

One species of SAV, Eurasian watermilfoil (*Myriophyllum spicatum*), was observed within the survey area. Filamentous algae were also observed. Eurasian watermilfoil was observed floating within the survey area. The pieces of floating Eurasian watermilfoil were generally small (less than 12 inches long) and were encountered infrequently. See attached photographic record for details.

The beds of Eurasian watermilfoil within the Kurt Iron Channel ranged in density from 1 to 3, based on a method developed by the U.S. Fish and Wildlife Service, adapted from the Braun-



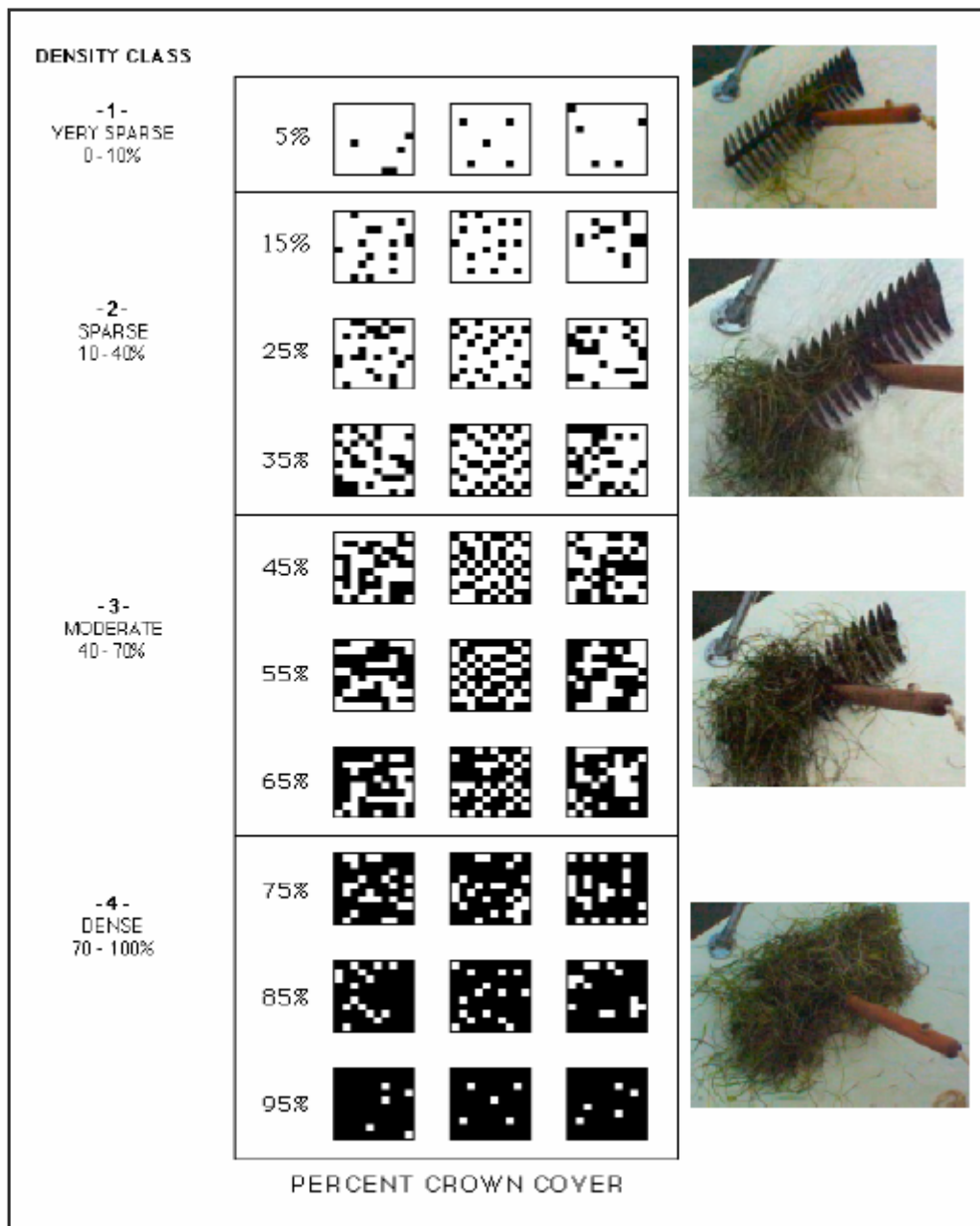
Figure 1. Location of Observed SAV in Kurt Iron Channel at Masonville During the October 2005 Survey

Blanquet scale. A figure depicting the density scale is attached (Figure 2). Total coverage of SAV at the time of the survey was approximately 16,654 sq ft (0.38 acres).

Recommendations

The survey was conducted at the end of the peak growing season for SAV in the region. SAV distribution, density, and composition (number of species) may be under represented by this survey due to the time of year it was conducted. If the project schedule allows, SAV surveys should be considered for the 2006 growing season.

Discussions with the relevant resource agencies should continue in regard to permit application and mitigation requirements. The SAV observed to be growing within the project footprint during this survey was confined to the shorelines of the Kurt Iron Channel. The sediment sampling results for the Kurt Iron Channel have demonstrated that this portion of the project footprint contains some of the most contaminated sediments.



Source: U.S. Fish and Wildlife Service, adapted from Braun-Blanquet scale used to rate SAV density through rake throws, adapted from VIMS website.

Figure 2. Density Classification of Collected SAV

Photographic Record

Masonville Dredged Material Containment Facility
Baltimore Harbor, Maryland
Submerged Aquatic Vegetation Survey (October 2005)



Rooted Eurasian watermilfoil
(*Myriophyllum spicatum*)



Eurasian watermilfoil observed along
banks of Kurt Iron channel



Eurasian watermilfoil observed in
shallow areas of Kurt Iron channel



Eurasian watermilfoil observed in
shallow areas of Kurt Iron channel



Eurasian watermilfoil observed in Kurt
Iron channel



Rooted Eurasian watermilfoil

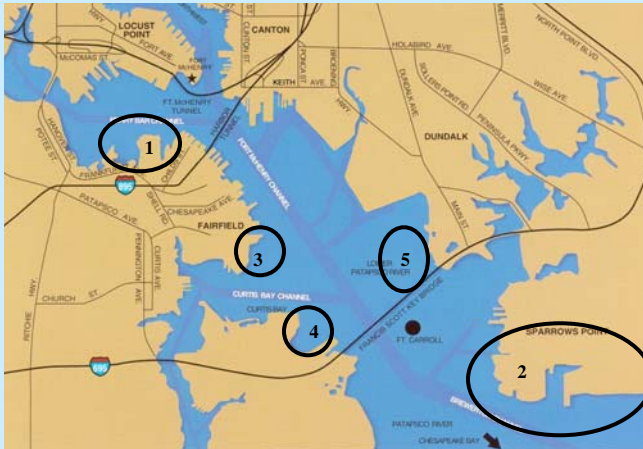
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ATTACHMENT B

BALTIMORE HARBOR FISHERIES STUDIES PRESENTATION (2003 – 2005)

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2003-2005 Baltimore Harbor Fisheries Studies



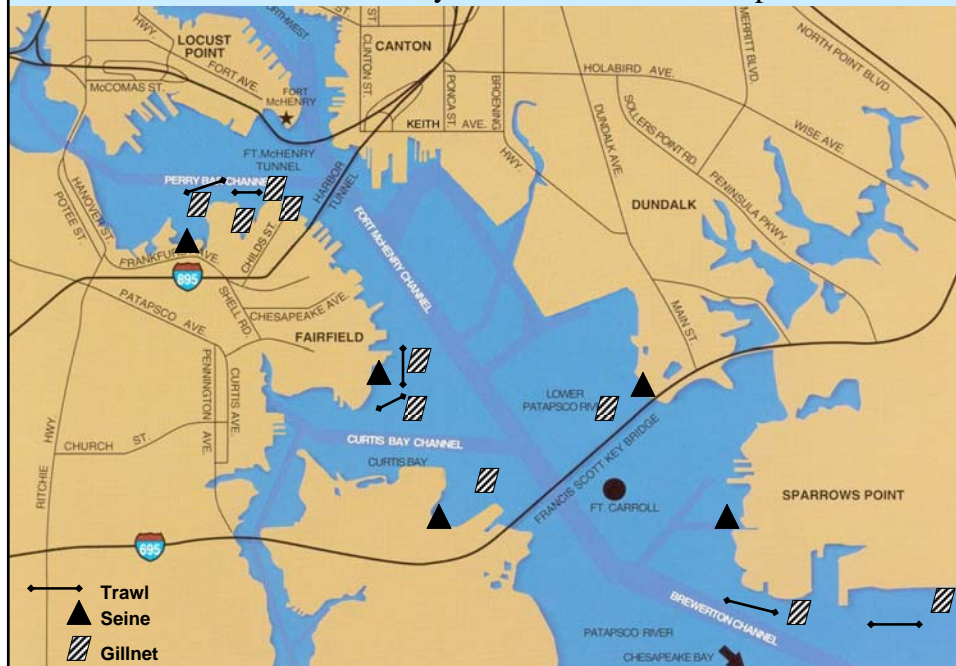
Maryland
Port
Administration

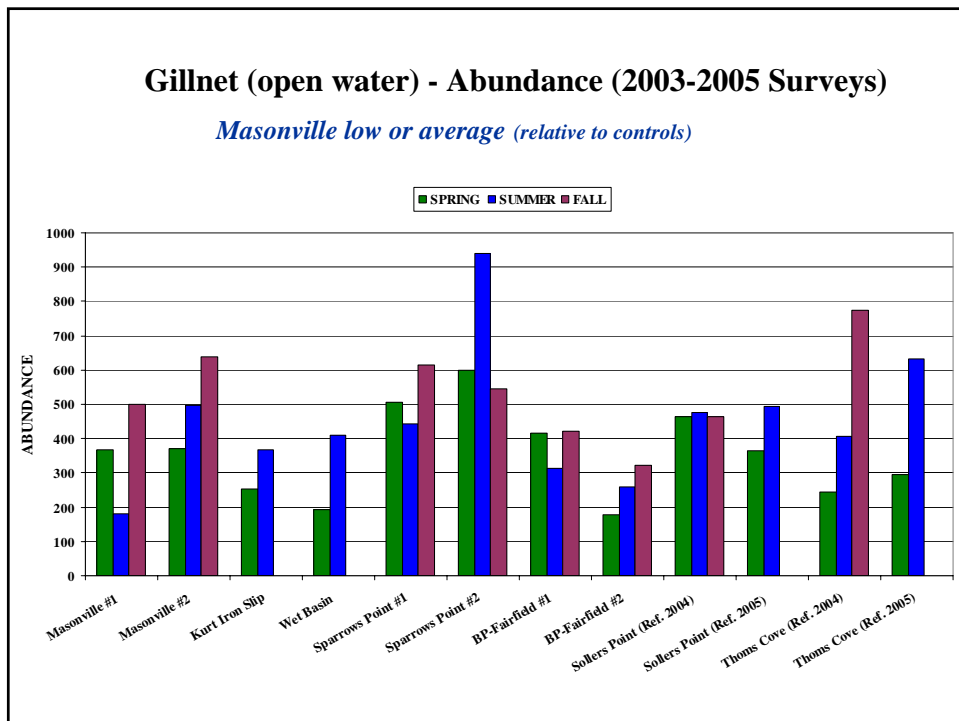
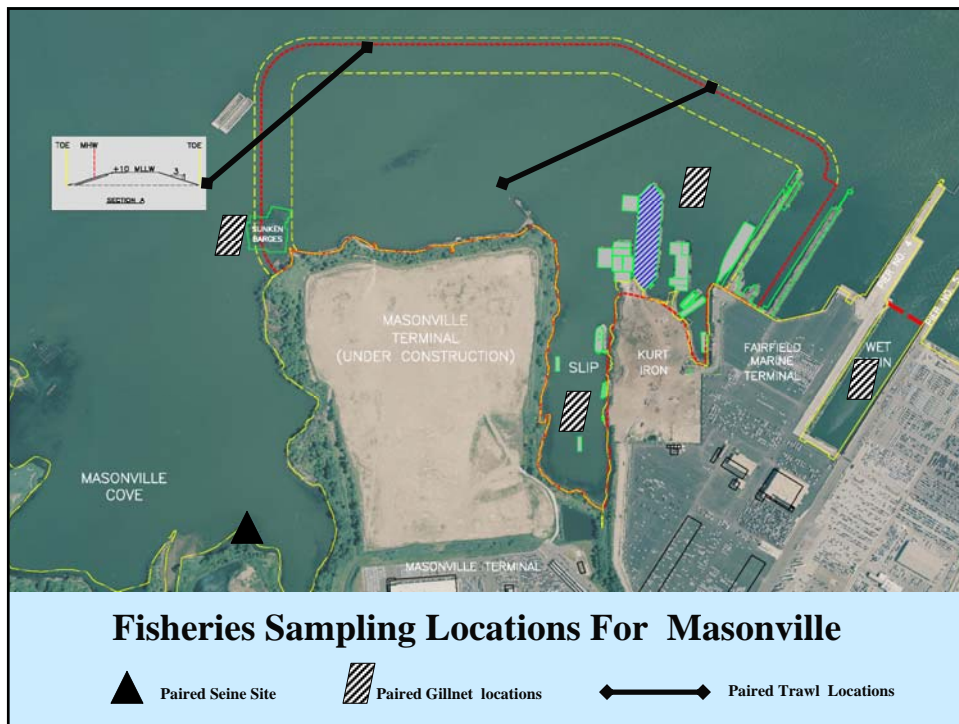


EA Engineering,
Science, and
Technology, Inc

1. Masonville
2. Sparrows Point
3. BP-Fairfield
4. Thoms Cove (reference)
5. Sollers Point (reference)

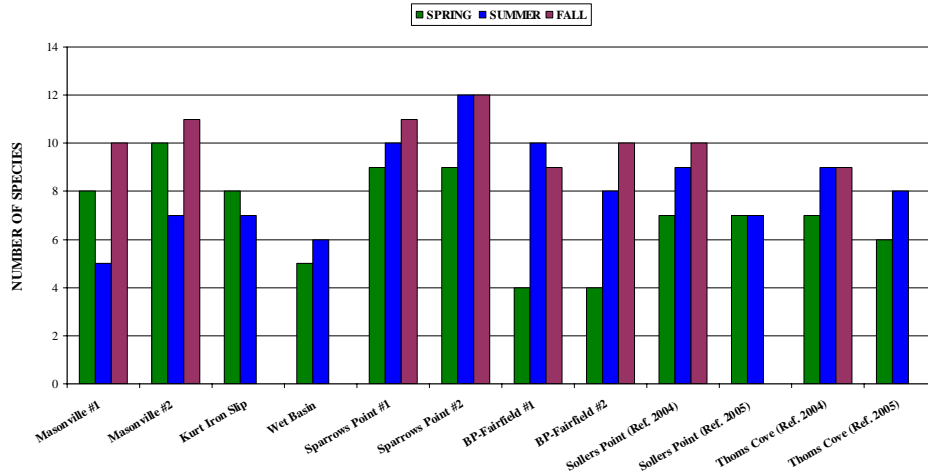
Fisheries Stations for Study of Harbor Placement Options





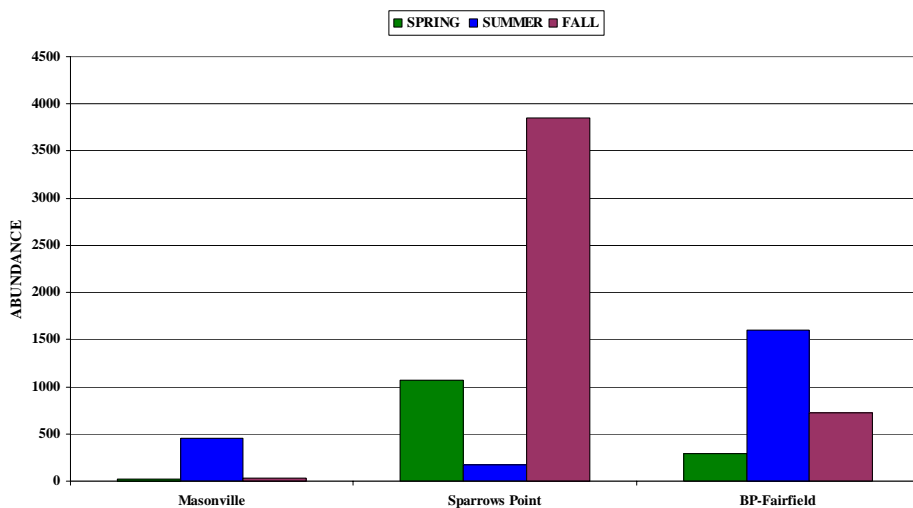
Gillnet (open water) - Number of Species (2003-2005 Surveys)

Masonville low or average (relative to controls)



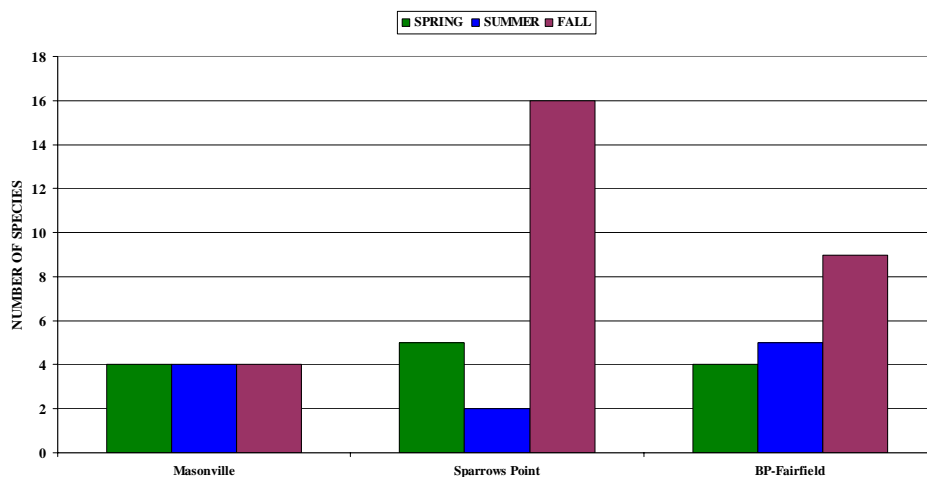
Trawl (bottom) - Abundance (2003-2005 Surveys)

Masonville low (relative to other sites in most seasons)



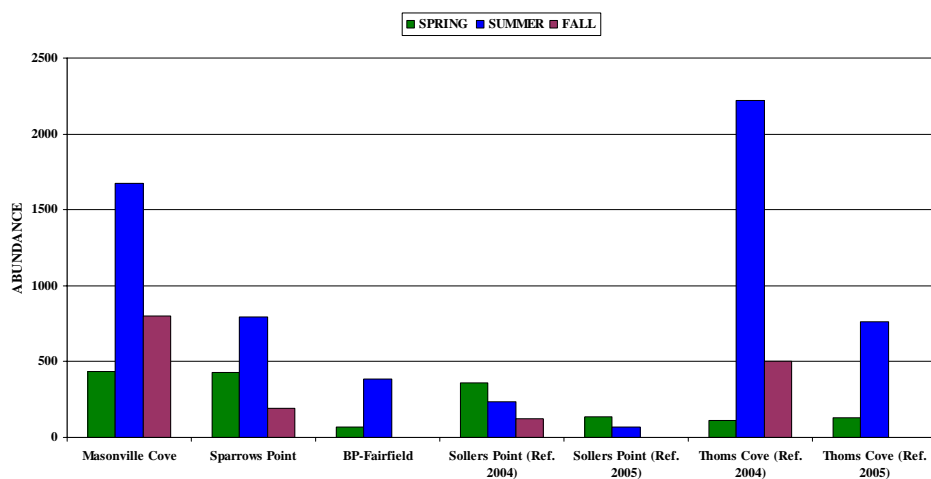
Trawl (bottom) - Number of Species (2003-2005 Surveys)

Masonville low (relative to other sites in most seasons)



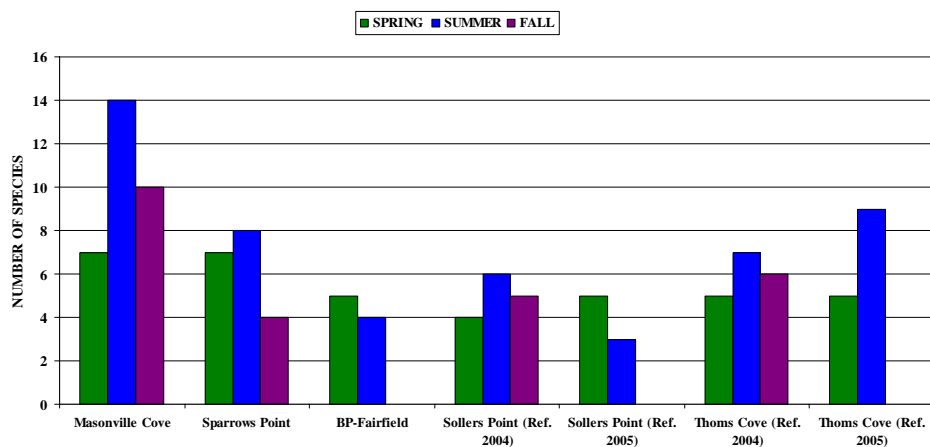
Seine (shoreline) –Abundance (2003-2005 Surveys)

Masonville Cove high (relative to most sites in most seasons)



Seine (shoreline) – Number of Species (2003-2005 Surveys)

Masonville Cove high (relative to most sites in most seasons)



fin



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ATTACHMENT C

WETLAND DELINEATION REPORT FOR THE MASONVILLE MARINE TERMINAL

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***WETLAND DELINEATION REPORT
FOR THE
MASONVILLE MARINE TERMINAL***

Prepared for:

Maryland Environmental Service
259 Najoles Drive
Millersville, Maryland
21108

Submitted to:

EA Engineering, Science & Technology
15 Loveton Circle
Sparks, Maryland 21152

Prepared by:

Chesapeake Environmental Management, Inc.
260 Gateway Drive, Suite 21-C
Bel Air, Maryland
21014

September 2006

Revised November 2006

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	GENERAL SITE DESCRIPTION	1
3.0	METHODS OF INVESTIGATION	1
4.0	FINDINGS.....	2
5.0	REFERENCES	7

FIGURES – Wetland Delineation Map

APPENDIX A – Wetland Data Sheets

1.0 INTRODUCTION

The Masonville Marine Terminal is slated to become a dredge material containment facility for dredging operations being conducted in the shipping channels of the Baltimore Harbor area. Various other improvement projects are also proposed at the site, including wetland creation, culvert improvements, trash and debris removal, and an environmental learning center. This Wetland Delineation Report was prepared by Chesapeake Environmental Management, Inc. (CEM) to meet the requirements of Section 404 of the Clean Water Act. The delineation was conducted as part of the mitigation projects for the Masonville Marine Terminal. The report has been revised to include delineation of tidal waters.

2.0 GENERAL SITE DESCRIPTION

The approximate 135-acre site is located along the southern bank of the Patapsco River in southern Baltimore City, Maryland. Specifically, the site is located just north of the Harbor Tunnel Thruway in the Brooklyn Area of Baltimore City. Access to the property is off of Frankfurst Avenue and off of Childs Street. The property is under the ownership of the Maryland Port Administration and is classified as industrial use. The site has significant amounts of previous human disturbance, including a refuse site for Baltimore City. Adjacent properties are also industrially-zoned.

Topography on the site is relatively flat, with steeper slopes occurring along banks of stream/drainage channels. Previous industrial activity has resulted in significant grading of the site including areas of micro-topography (berms and depressions). Due to the high degree of historical disturbance on the site, National Wetland Inventory (NWI) mapping was examined. The mapping indicated the site once had three palustrine wetlands located within an area observed during the field visit as previously disturbed with a portion of the area converted into a parking lot. NWI mapping indicated areas of estuarine wetlands along the banks of the Patapsco River, which were still observed during the field visit; this revised report includes tidal wetland mapping. Floodplain information was reviewed from FEMA "Flood Insurance Rate Maps" and showed portions of the property along the Patapsco within the 100-year floodplain. The Patapsco River is designated by the Maryland Department of the Environment as a Use-I stream at the site.

3.0 METHODS OF INVESTIGATION

Non-tidal wetlands and "Waters of the U. S." were delineated according to the Corps of Engineers 1987 Wetland Delineation Manual on April 19th and April 25th, 2006. All three wetland parameters of hydrophilic vegetation, wetland hydrology, and hydric soils were examined. Wetland data points were collected along with a representative upland data point to delineate the wetland boundary and to verify the limits of the jurisdictional

wetland areas (see Appendix A, Wetland Data Sheets). Tidal wetlands were delineated on October 5th, 2006. A combination of field verification, and aerial photograph interpretation were used to generate the tidal wetlands included on the wetland mapping. Flagging was placed in areas of tidal/freshwater wetland transition and extended to the main tidal portion of the Patapsco.

4.0 FINDINGS

Four different palustrine emergent (PEM) communities were observed on the site (discussed below). One additional perennial stream (flagging W2-A1 through W2-A10) was observed in the western portion of the site. The stream originated from a culvert below Frankfur Avenue and flowed to the north into tidal areas of the Patapsco River. The entire northern boundary of the site is bordered by both tidal riverine and tidal emergent wetlands associated with the Patapsco River. Two tidal emergent areas were observed that extended inland from the Patapsco River.

PEM 1 0.35 acres (flagging W1-1 through W1-30)

PEM 1 was located at the western edge of the site. The PEM appears to have been man-made, having ditch-like characteristics (Photo 1). The linear PEM originates just south of Frankfur Avenue at a culvert and extends northward, making a 90 degree turn westward until it reaches the tidal portions of the Patapsco River. The PEM is dominated by Phragmites, an invasive species with a facultative wet (FACW) status. Hydrology (inundation, saturated soils and drainage patterns) and hydric soils (low chroma soils with mottling and sulfuric odor) criteria were also met. Hydrology is most likely provided by a combination of groundwater, due to the lower grade of the PEM, and surface water runoff.

PEM 2 1.2 acres (flagging W3-1 through W3-30)

PEM 2 was located to the east of PEM 1 and appears to provide stormwater management for the larger parking pad located directly to the west (photo 2). A piped conveyance at the northwestern edge of the PEM provides a connection with the Patapsco River. A small segment of riprap channel stream was observed beyond the piped conveyance before the system connected into tidal areas of the Patapsco River. No flow was observed in the riprap channel during the time of the investigation. The PEM is dominated by Phragmites, an invasive species. Although no inundated or saturated areas were observed during the time of the delineation, drainage patterns were observed within the PEM. Hydrology is most likely provided by surface water runoff from the adjacent large paved parking lot. The hydric soils criteria (low chroma soils) were also met.



Photo 1: PEM 1.



Photo 2: PEM 2.

PEM 3 0.1 acres (flagging W4-23 through W4-36)

& 1.05 acres Open Water (flagging W4-1 through 22; W4-37 through WA4-43)

PEM 3 is located within the eastern portion of the site appears to have been man-made, having ditch-like characteristics. The linear PEM originates within an undeveloped strip of land located between impervious surface areas associated with the Masonville Marine Terminal to the west and the Fairfield Marine Terminal to the east. The PEM empties into an open water stormwater management pond (photo 3), which is connected to tidal portions of the Patapsco River through a piped conveyance along the northern edge of the pond. The PEM is dominated by Phragmites, an invasive species with a facultative wet (FACW) status and is bordered by Black Willow with a FACW+ status. Hydrology (drainage patterns) and hydric soils (low chroma soils with mottling) criteria were also met. Hydrology is most likely provided by surface water runoff from adjacent impervious areas.



Photo 3: Stormwater Management Pond associated with PEM 3.

PEM 4 0.26 acres (flagging W5-1 through W5-31)

PEM 4 is located directly to the east of PEM 3 and is parallel with PEM 3 and the open water stormwater management pond. The linear PEM also originates within an undeveloped strip of land located between impervious surface areas associated with the Masonville Marine Terminal to the west and the Fairfield Marine Terminal to the east. The PEM empties into tidal portions of the Patapsco River. The PEM is dominated by Phragmites, an invasive species. Hydrology (inundated/saturated soils and drainage patterns) and hydric soils

(low chroma soils with mottling) criteria were also met. Hydrology is most likely provided by a combination of groundwater, due to the lower grade of the PEM (areas closer to the Patapsco) and surface water runoff from adjacent impervious areas.



Photo 4: PEM 4.

TIDAL Wetlands

A combination of field verification, and aerial photograph interpretation were used to generate the tidal wetlands bordering the Patapsco River. Flagging was placed in areas of tidal/freshwater wetland transition and extended to the main tidal portion of the Patapsco.

Two tidal emergent wetlands were flagged that extend inland from the Patapsco River border. These wetlands are associated with PEM 1 (0.29 Acres) and PEM 4 (0.19 Acres), as the tidal portions of the associated wetlands (see Figure). These areas were dominated by Phragmites, tidal hydrology and low-chroma hydric soils.

The entire northern boundary of the site is bordered by both tidal riverine and tidal emergent wetlands associated with the Patapsco River. The average width of the tidal wetland areas is 5 feet. Tidal wetlands bordering the Patapsco River include mudflats and areas dominated by emergent vegetation.

Within the area of the proposed dike and dredge placement, the tidal portion of PEM 4 (0.19 Acres) and a total of 3,650 linear feet of tidal wetlands stretch along the shoreline. The shoreline areas, dominated by Phragmites, have an average width of 5 feet. A simple area calculation within the dredge material placement footprint for the shoreline tidal wetland area yields an estimated 0.42 acres. Thus the combined tidal wetland portion of PEM 4 and shoreline area produces a total of 0.61 acres of tidal emergent wetlands within the dredge material placement footprint.



Photo 5: Tidal portions of tributary to Patapsco River.

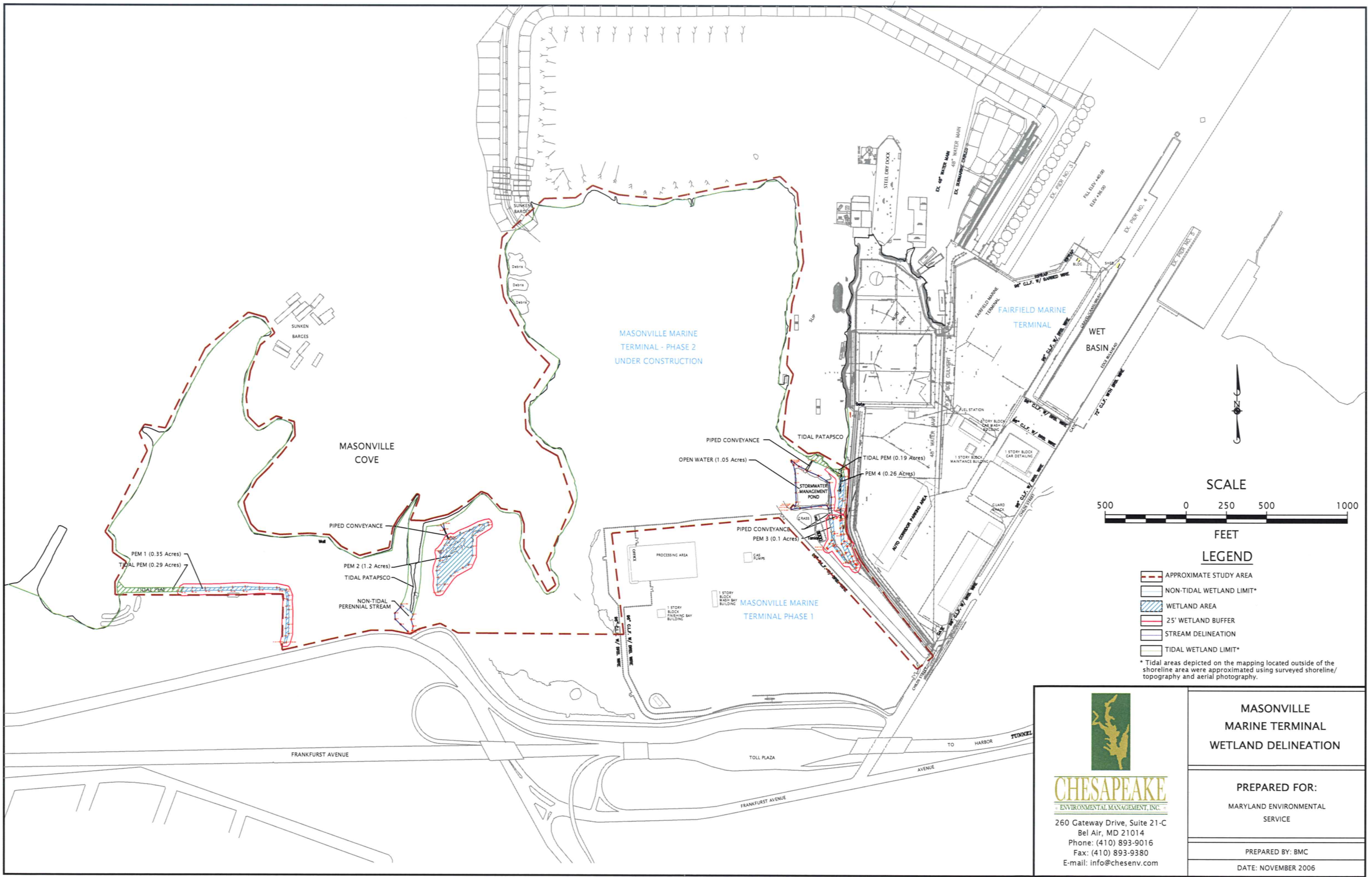
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FIGURES

Wetland Delineation Map

Aerial Photograph





CHESAPEAKE
ENVIRONMENTAL MANAGEMENT, INC.

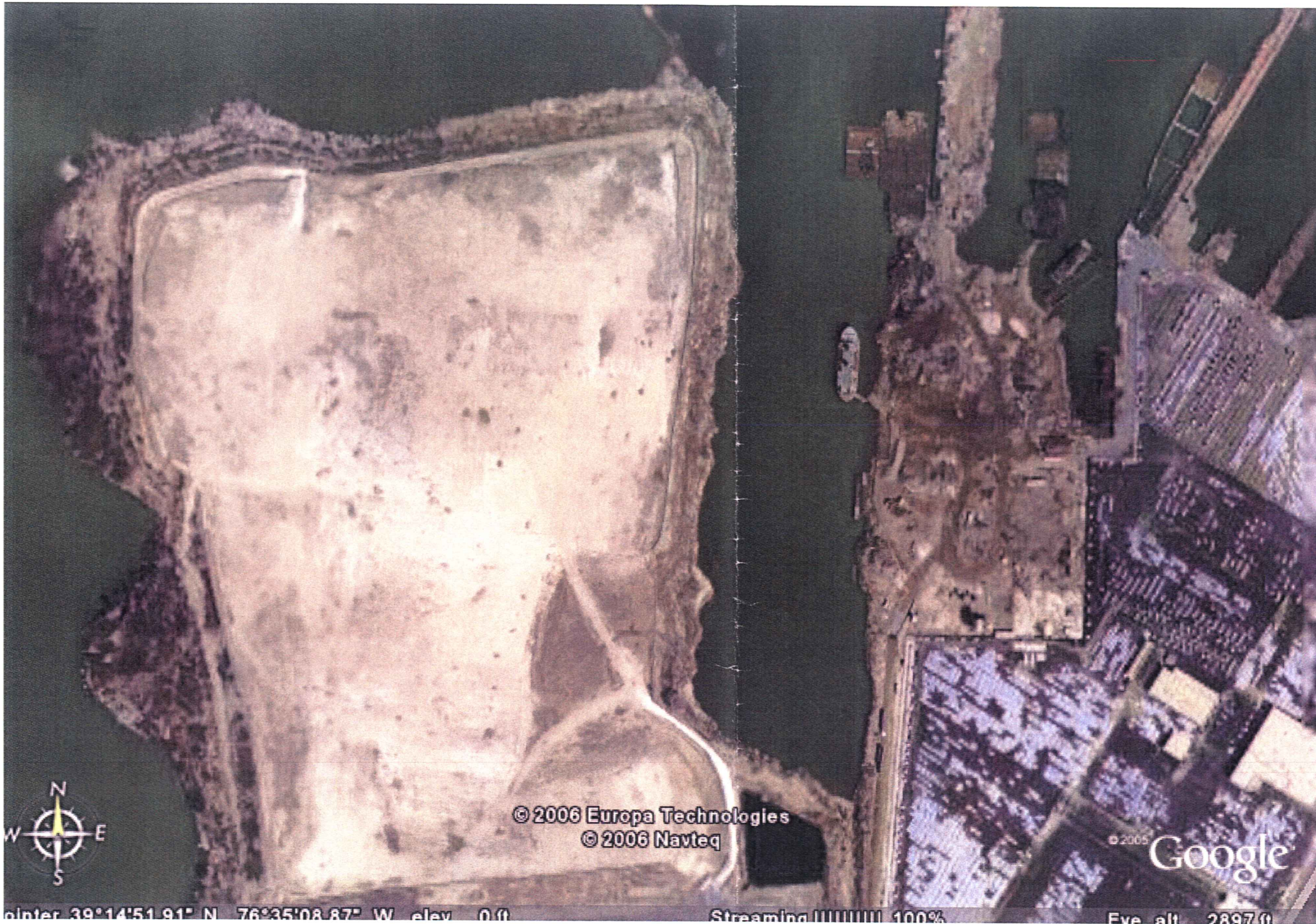
260 Gateway Drive, Suite 21-C
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Phone: (410) 893-9016
Fax: (410) 893-9380
E-mail: info@chesenv.com

**MASONVILLE
MARINE TERMINAL
WETLAND DELINEATION**

PREPARED FOR:
MARYLAND ENVIRONMENTAL
SERVICE

PREPARED BY: BMC

DATE: NOVEMBER 2006



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Point: 39°14'51.91" N 76°35'08.87" W elev: 0.0

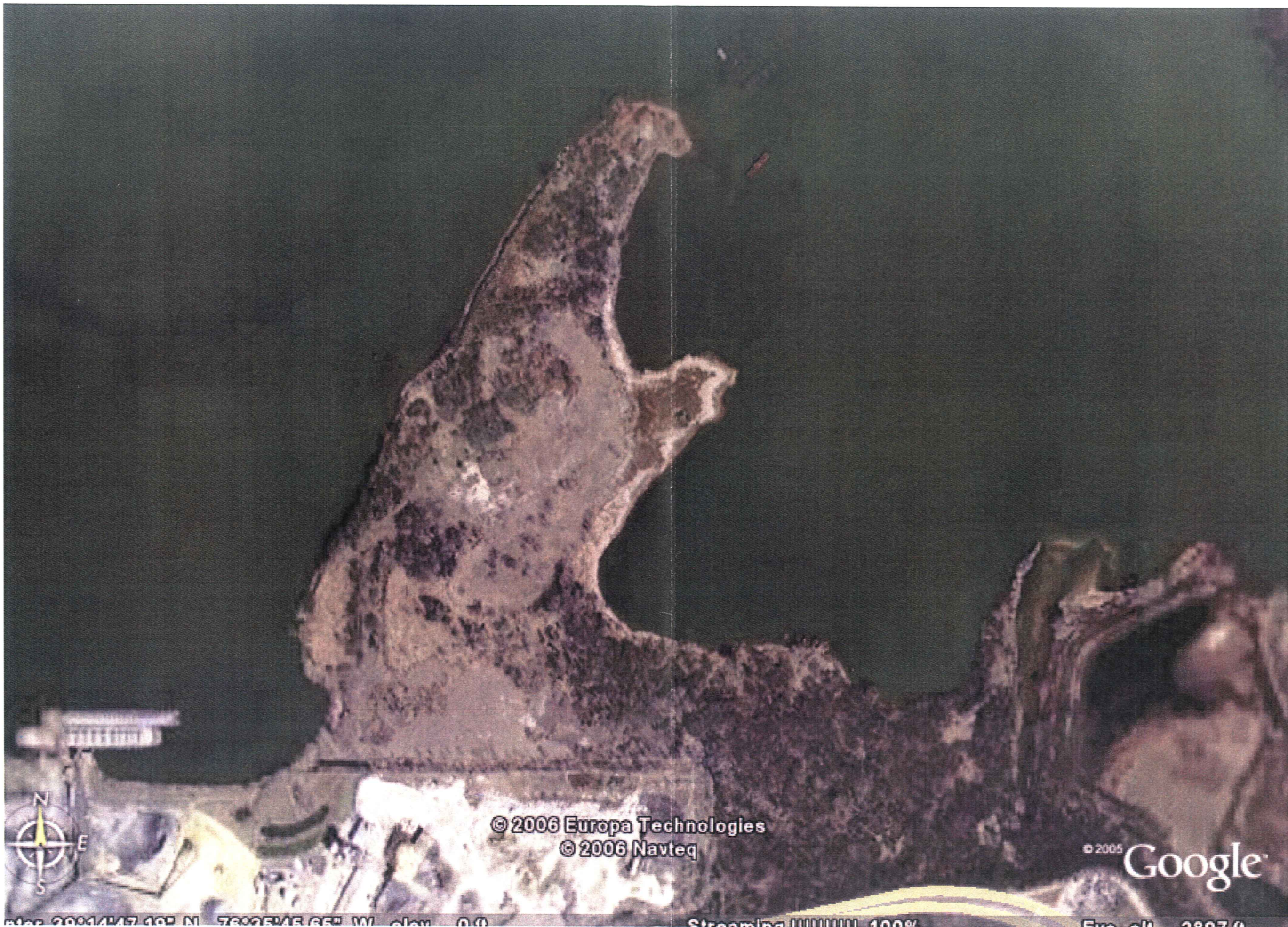
Streaming 100%

Eye alt: 2897.0



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APPENDIX A

Wetland Data Sheets

SOILS

Project/Site:	Masonville	Date:	5/5/2006
Application/Owner:		County:	Balt. City
Investigator:	RAN, NJV	State:	MD
Do Normal Circumstances exist on the site?	X	Yes	No
Is the site significantly disturbed (Atypical Situation)?		Yes	X
Is the area a potential Problem Area?		Yes	X
		Community ID	PEM
		Transect ID:	
		Plot ID:	W4-A33

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Phragmites australis	GRASS	FACW	9.		
2. Salix nigra	TREE	FACW+	10.		
3. Rubus sp.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		
Percent of Dominant Species that area OBL, FACW, or FAC (excluding FAC-).					
Remarks:					

HYDROLOGY

Recorded Data (Describe in Remarks) Stream, Lake, or Tide Gauge Aerial Photographs Other No Recorded Data	Primary Indicators: Inundated Saturated In Upper 12 Inches Water Marks Drift Lines Sediment Deposits Drainage Patterns in Wetlands
Field Observations: Depth to Surface Water: N/A (in.) Depth to Free Water in Pit: N/A (in.) Depth to Saturated Soil: N/A (in.)	Secondary Indicators (2 or more required): Oxidized Root Channels in Upper 12 inches Water-Stained Leaves Local Soil Survey Data FAC-Neutral Test Other (Explain in Remarks)
Remarks:	

SOILS

Map Unit Name (Series and Phase):		Sulfatepts, dredge		Drainage Class:		Poorly drained	
Taxonomy (Subgroup)		Field Observations Confirm Mapped Type?					
		Yes ___ No ___					
<u>Profile Description:</u>							
Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.		
0-1	O	10YR 3/1					
1-5	A	10YR 5/6			sand		
5+	B	10YR 5/6	10YR 6/6	common/faint	sandy clay		
Hydric Soil Indicators:							
___ Histosol		___ Concretions					
___ Histic Epipedon		___ High Organic Content in Surface Layer in Sandy Soils					
___ Sulfidic Odor		___ Organic Streaking in Sandy Soils					
___ Aquic Moisture Regime		___ Listed on Local Hydric Soils List					
___ Reducing Conditions		___ Listed on National Hydric Soils List					
X Gleyed or Low-Chroma Colors		___ Other (Explain in Remarks)					
Remarks: Consistent B layer is over 15' deep. Man-made ditch.							

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X ___ Yes ___ No ___	Is this Sampling Point Within a Wetland?	X ___ Yes ___ No ___
Wetland Hydrology Present?	X ___ Yes ___ No ___		
Hydric Soils Present?	X ___ Yes ___ No ___		
Remarks:			

ROUTINE WETLAND DETERMINATION FORM

Project/Site: Masonville	Date: 5/5/2006
Application/Owner:	County: Balt. City
Investigator: RAN, NJV	State: MD
Do Normal Circumstances exist on the site?	X Yes ___ No
Is the site significantly disturbed (Atypical Situation)?	___ Yes X ___ No
Is the area a potential Problem Area?	___ Yes X ___ No
Community ID	PEM
Transect ID:	W5-A4
Plot ID:	

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Phragmites australis	GRASS	FACW	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		
Percent of Dominant Species that area OBL, FACW, or FAC (excluding FAC-).					
Remarks:					

<p>Recorded Data (Describe in Remarks)</p> <p>Stream, Lake, or Tide Gauge</p> <p>Aerial Photographs</p> <p>Other</p> <p>No Recorded Data</p>		<p>Primary Indicators:</p> <p>X Inundated</p> <p>X Saturated In Upper 12 Inches</p> <p>Water Marks</p> <p>Drift Lines</p> <p>Sediment Deposits</p> <p>X Drainage Patterns in Wetlands</p>
<p>Field Observations:</p> <p>Depth to Surface Water: 6 (in.)</p> <p>Depth to Free Water in Pit: 0 (in.)</p> <p>Depth to Saturated Soil: 0 (in.)</p>		<p>Secondary Indicators (2 or more required):</p> <p>Oxidized Root Channels in Upper 12 inches</p> <p>Water-Stained Leaves</p> <p>Local Soil Survey Data</p> <p>FAC-Neutral Test</p> <p>Other (Explain in Remarks)</p>
<p>Remarks: Standing water, backflow from KIM channel.</p>		

SOILS

Map Unit Name (Series and Phase):		Sulfaquepts, dredge		Drainage Class:		Poorly drained																																					
Taxonomy (Subgroup):		Field Observations Confirm Mapped Type?																																									
		___ Yes ___ No																																									
<p>Profile Description:</p> <table> <tr> <th>Depth (Inches)</th> <th>Horizon</th> <th>Matrix Color (Munsell Moist)</th> <th>Mottle Colors (Munsell Moist)</th> <th>Mottle Abundance/Contrast</th> <th>Texture, Concretions, Structure, etc.</th> </tr> <tr> <td>0-12+</td> <td>A</td> <td>10YR 3/1</td> <td>10YR 6/8</td> <td>few/distinct</td> <td>sand/silt</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>								Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.	0-12+	A	10YR 3/1	10YR 6/8	few/distinct	sand/silt																								
Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.																																						
0-12+	A	10YR 3/1	10YR 6/8	few/distinct	sand/silt																																						
<p>Hydric Soil Indicators:</p> <p>___ Histosol</p> <p>___ Histic Epipedon</p> <p>___ Sulfidic Odor</p> <p>___ Aquic Moisture Regime</p> <p>___ Reducing Conditions</p> <p>X Gleyed or Low-Chroma Colors</p> <p>Concretions</p> <p>High Organic Content in Surface Layer in Sandy Soils</p> <p>Organic Streaking in Sandy Soils</p> <p>Listed on Local Hydric Soils List</p> <p>Listed on National Hydric Soils List</p> <p>Other (Explain in Remarks)</p>																																											
Remarks:																																											

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X Yes ___ No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	X Yes ___ No	
Hydric Soils Present?	X Yes ___ No	
Remarks:		

ROUTINE WETLAND DETERMINATION FORM

Project/Site: Masonville	Date: 5/5/2006
Application/Owner: RAN, NJV	County: Balt. City
Investigator: RAN, NJV	State: MD
Do Normal Circumstances exist on the site?	X Yes ___ No
Is the site significantly disturbed (Atypical Situation)?	___ Yes X ___ No
Is the area a potential Problem Area?	___ Yes X ___ No
Community ID	PEM
Transect ID:	W1-A3
Plot ID:	

VEGETATION		Dominant Plant Species		Stratum	Indicator
Dominant Plant Species	Stratum	Indicator	GRASS	FACW	
1. Phragmites australis					9.
2.					10.
3.					11.
4.					12.
5.					13.
6.					14.
7.					15.
8.					16.

Percent of Dominant Species that area OBL, FACW, or FAC (excluding FAC-):

Remarks:

HYDROLOGY	
Recorded Data (Describe in Remarks)	Primary Indicators:
Stream, Lake, or Tide Gauge	X Inundated
Aerial Photographs	X Saturated in Upper 12 Inches
Other	Water Marks
No Recorded Data	Drift Lines
	Sediment Deposits
	X Drainage Patterns in Wetlands
Field Observations:	Secondary Indicators (2 or more required):
Depth to Surface Water: 2 (in.)	Oxidized Root Channels in Upper 12 inches
Depth to Free Water in Pit: 0 (in.)	Water-Stained Leaves
Depth to Saturated Soil: 0 (in.)	Local Soil Survey Data
	FAC-Neutral Test
	Other (Explain in Remarks)
Remarks:	

SOILS

Map Unit Name (Series and Phase):	Udorthents, smoothed	Drainage Class:	Poorly to excessively drained
Taxonomy (Subgroup)	Field Observations Confirm Mapped Type?		
		Yes ___ No	
Profile Description:			
Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)
0-12+	A	10YR 4/1	10YR 5/6
Hydric Soil Indicators:			
Histosol			
Histc Epipedon			
X Sulfidic Odor			
Aquic Moisture Regime			
Reducing Conditions			
X Gleyed or Low-Chroma Colors			
Concretions			
High Organic Content in Surface Layer in Sandy Soils			
Organic Streaking in Sandy Soils			
Listed on Local Hydric Soils List			
Listed on National Hydric Soils List			
Other (Explain in Remarks)			
Remarks: Man-made ditch.			

WETLAND DETERMINATION	
Hydrophytic Vegetation Present?	X Yes ___ No
Wetland Hydrology Present?	X Yes ___ No
Hydric Soils Present?	X Yes ___ No
Is this Sampling Point Within a Wetland? X Yes ___ No	
Remarks:	

ROUTINE WETLAND DETERMINATION FORM

Project/Site:	Masonville	Date:	5/5/2006
Application/Owner:		County:	Balt. City
Investigator:	RAN, NJV	State:	MD
Do Normal Circumstances exist on the site?		X	Yes
Is the site significantly disturbed (Atypical Situation)?		___	Yes
Is the area a potential Problem Area?		___	Yes
Community ID		PEM	
Transect ID:		W3-A10	
Plot ID:			

VEGETATION		
Dominant Plant Species	Stratum Indicator	Stratum Indicator
1. Phragmites australis	GRASS	FACW
2.	10.	
3.	11.	
4.	12.	
5.	13.	
6.	14.	
7.	15.	
8.	16.	

Percent of Dominant Species that area OBL, FACW, or FAC (excluding FAC-):

Remarks:

HYDROLOGY	
Recorded Data (Describe in Remarks)	Primary Indicators:
Stream, Lake, or Tide Gauge	Inundated
Aerial Photographs	Saturated In Upper 12 Inches
No Recorded Data	Water Marks
	Drift Lines
	Sediment Deposits
	X Drainage Patterns in Wetlands
Field Observations:	Secondary Indicators (2 or more required):
Depth to Surface Water: N/A (in.)	Oxidized Root Channels in Upper 12 inches
Depth to Free Water in Pit: N/A (in.)	Water-Stained Leaves
Depth to Saturated Soil: N/A (in.)	Local Soil Survey Data
	FAC-Neutral Test
	Other (Explain in Remarks)
Remarks:	Moist but not saturated (no rain in 3 weeks).

SOILS

Map Unit Name (Series and Phase):		Sulfaquepts, dredge		Drainage Class:		Poorly drained	
Taxonomy (Subgroup)		Field Observations Confirm Mapped Type?					
Yes		No		Yes		No	
Profile Description:							
Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.		
0-12+	A	10YR 4/1	7.5YR 4/6	many/distinct	sandy clay loam		
Hydric Soil Indicators:							
Histosol		Concretions					
Histc Epipedon		High Organic Content in Surface Layer in Sandy Soils					
Sulfitic Odor		Organic Streaking in Sandy Soils					
Aquic Moisture Regime		Listed on Local Hydric Soils List					
Reducing Conditions		Listed on National Hydric Soils List					
X Gleyed or Low-Chroma Colors		Other (Explain in Remarks)					
Remarks:							

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	X	Yes	No
Wetland Hydrology Present?	X	Yes	No
Hydric Soils Present?	X	Yes	No
Is this Sampling Point Within a Wetland?			X
Yes			No
Remarks: COE created wetland.			

ROUTINE WETLAND DETERMINATION FORM

Project/Site: Masonville	Date: 5/5/2006
Application/Owner:	County: Balt. City
Investigator: RAN, NJV	State: MD
Do Normal Circumstances exist on the site?	X Yes ___ No
Is the site significantly disturbed (Atypical Situation)?	___ Yes X ___ No
Is the area a potential Problem Area?	___ Yes X ___ No
Community ID: Upland Sample Pt.	
Transect ID: 50' SW of W3-A10	
Plot ID:	

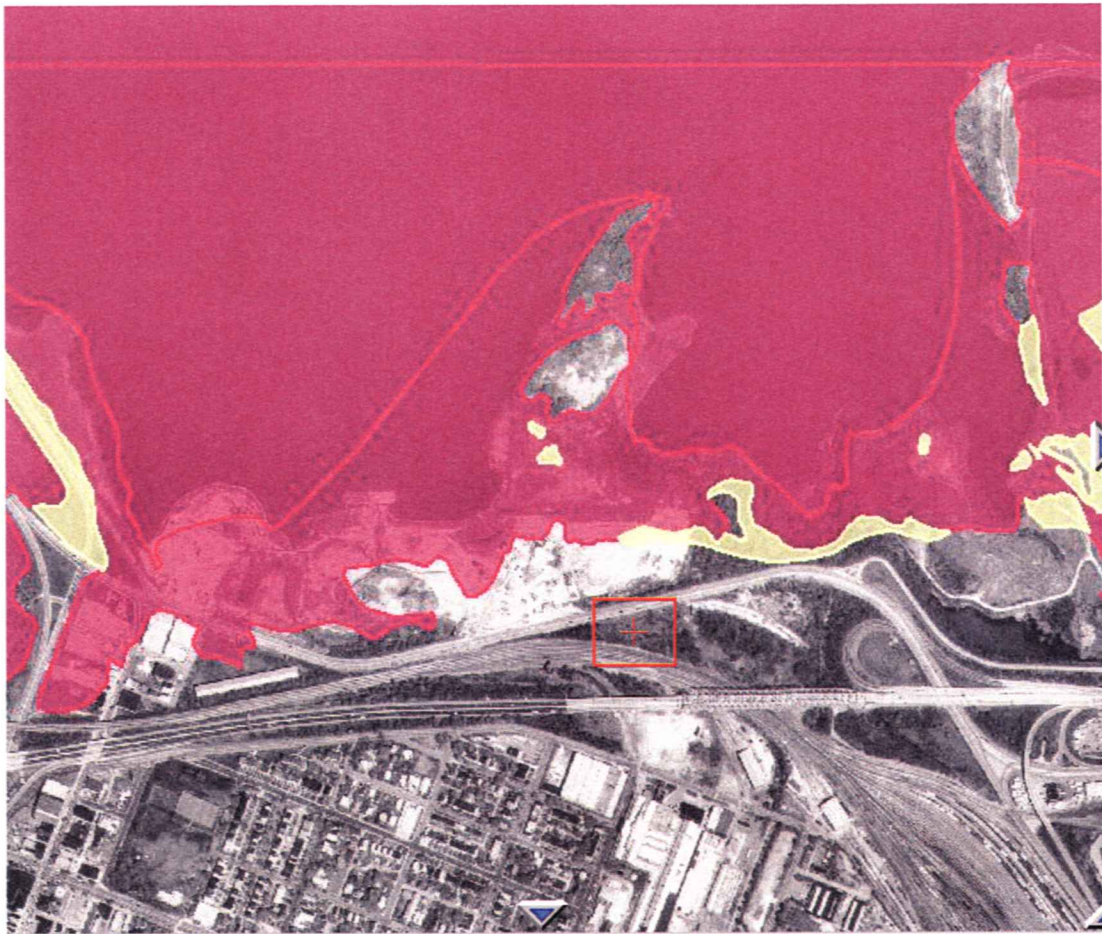
VEGETATION		Dominant Plant Species	Stratum	Indicator	Stratum	Indicator
1.	Robinia pseudoacacia	TREE	FACU-	9.		
2.	Galium aparine	HERB	FACU	10.		
3.	Lonicera japonica	VINE	FAC-	11.		
4.	Rosa multiflora	VINE	FACU	12.		
5.	Toxicodendron radicans	HERB	FAC	13.		
6.	Rubus sp.			14.		
7.				15.		
8.				16.		
Percent of Dominant Species that area OBL, FACW, or FAC (excluding FAC-):						
Remarks:						

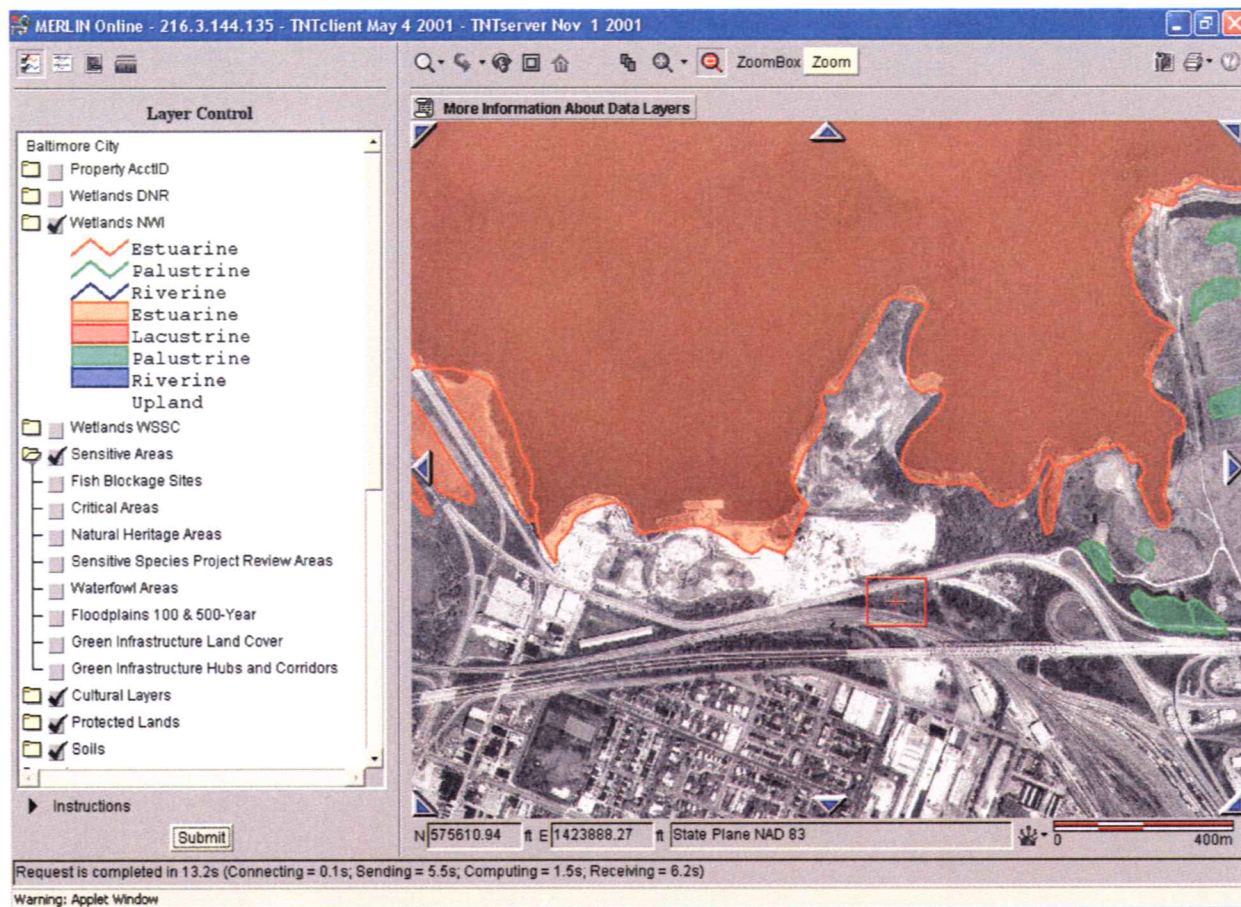
HYDROLOGY	
Recorded Data (Describe in Remarks):	Primary Indicators:
Stream, Lake, or Tide Gauge	___ Inundated
Aerial Photographs	___ Saturated In Upper 12 Inches
Other	___ Water Marks
No Recorded Data	___ Drift Lines
	___ Sediment Deposits
	___ Drainage Patterns in Wetlands
Field Observations:	Secondary Indicators (2 or more required):
Depth to Surface Water: N/A (in.)	___ Oxidized Root Channels in Upper 12 inches
Depth to Free Water in Pit: N/A (in.)	___ Water-Stained Leaves
Depth to Saturated Soil: N/A (in.)	___ Local Soil Survey Data
	___ FAC-Neutral Test
	___ Other (Explain in Remarks)
Remarks:	

SOILS

Map Unit Name (Series and Phase):	Sulfaquepts, dredge	Drainage Class:	Poorly drained		
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type?				
	___ Yes ___ No				
Profile Description:					
Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12+	A	10YR 5/4	10YR 5/3	few/faint	sand and gravel
Hydric Soil Indicators:					
___ Histosol					
___ Histic Epipedon					
___ Sulfitic Odor					
___ Aquic Moisture Regime					
___ Reducing Conditions					
___ Gleyed or Low-Chroma Colors					
___ Concretions					
___ High Organic Content in Surface Layer in Sandy Soils					
___ Organic Streaking in Sandy Soils					
___ Listed on Local Hydric Soils List					
___ Listed on National Hydric Soils List					
___ Other (Explain in Remarks)					
Remarks: Fill material.					

WETLAND DETERMINATION	
Hydrophytic Vegetation Present?	Yes X ___ No
Wetland Hydrology Present?	___ Yes X ___ No
Hydric Soils Present?	___ Yes X ___ No
Is this Sampling Point Within a Wetland? ___ Yes X ___ No	
Remarks:	



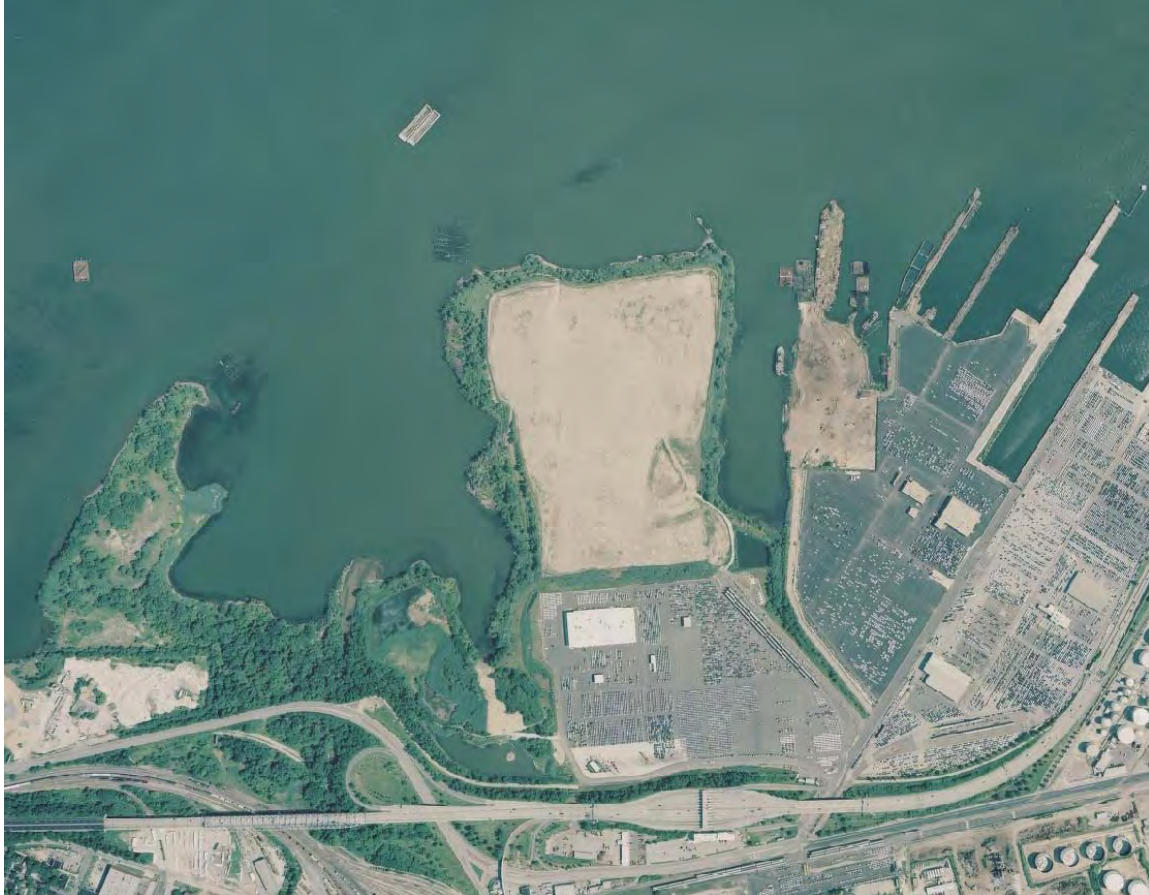


ATTACHMENT D

SUBMERGED AQUATIC VEGETATION SURVEY OF THE PROPOSED MASONVILLE DMCF FOOTPRINT AND THE ADJACENT MASONVILLE COVE

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SUBMERGED AQUATIC VEGETATION SURVEY OF THE PROPOSED MASONVILLE DMCF FOOTPRINT AND THE ADJACENT MASONVILLE COVE



Prepared For:
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Contract Number: 07-07-02

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October 2006

SUBMERGED AQUATIC VEGETATION SURVEY OF THE PROPOSED MASONVILLE DMCF FOOTPRINT AND THE ADJACENT MASONVILLE COVE

Introduction

Submerged aquatic vegetation (SAV) surveys were conducted within the Patapsco River in Baltimore City, adjacent to the proposed dredged material containment facility (DMCF), at Masonville (Figure 1). This report contains the results of two recent survey events, conducted on June 8 and August 17, 2006, as well as past data obtained from an SAV survey conducted on October 19, 2005.

The general study area for the SAV survey was the right bank of the Patapsco River, bounded by the western point of Masonville Cove, east to Kurt Iron and Metal (KIM) Channel. The study include areas with water depths less than or equal to 2 meters within Masonville Cove, the current shoreline of the DMCF, and KIM Channel. The survey did include some stations with water depths in excess of 2 meters at the time of the survey. These stations were isolated pockets of deeper water within the overall study area and were included in the survey to provide a comprehensive depiction of the distribution of SAV within the study area.

The primary objective of the SAV surveys was to document the presence or absence of SAV within the footprint of the proposed DMCF and Masonville Cove. The SAV species observed were identified. A density class was assigned to the samples collected.

Methods

Transects traversing the study area, developed prior to fieldwork, were oriented north-south with approximate 500 ft spacing (Figure 2). Sampling along the transects occurred at 100 ft intervals, unless site conditions prevented effective sampling (i.e., the presence of sunken barges and other substantial debris). The surveys were comprised of 109 sampling stations on nine transects. At each sampling point, SAV presence or absence, species information, and density data were recorded.

The surveys were conducted from an open work boat. A Trimble® ProXR Global Positioning System (GPS) was used to navigate to station locations. The X and Y coordinates predetermined for the sampling points were uploaded to the GPS unit prior to starting the field surveys.

An iron dethatching rake was used as a collection device. The rake was thrown into the water, pulled across the bottom, and brought to the surface. Five throws of the rake were conducted at each survey station to assess the extent and species composition of the SAV species coverage. Vegetation collected by the rake, if any, was brought on board and identified to species level. The density for each rake throw was recorded on field datasheets. Measurements of density were recorded as 0 through 4, based upon methods

developed by USFWS (2002) (Figure 3). For the density classification of collected SAV, a “0” corresponded to a lack of SAV, “1” corresponded to a very sparse density class, “2” corresponded to a sparse density class, “3” corresponded to a moderate density class, and “4” corresponded to a dense density class. Figure 3 presents examples of the various density classifications.

To summarize, at each sampling station, during each of the two surveys, the following approach was taken:

1. Five sample collection (raking) attempts occurred.
2. SAV species collected from the bottom was brought onboard and identified.
3. SAV species density for each rake throw was recorded.

Results

June 2006 Survey

Two species of SAV, horned pondweed (*Zannichellia palustris*) and Eurasian watermilfoil (*Myriophyllum spicatum*), were observed within the survey area. Horned pondweed is a native species and Eurasian watermilfoil is a non-native species. The horned pondweed was in flower and fruit at the time of the June 2006 survey. Filamentous algae and sea lettuce were also observed; attached to the sediment surface and floating throughout the survey area.

Horned pondweed was observed at 18 of the 109 stations in water depths that ranged from 1.5 to 6.4 ft at the time of the survey. Eurasian watermilfoil was observed at 2 of the 109 stations. Horned pondweed was observed at the same 2 stations. Figure 4 depicts the stations locations that supported SAV.

The beds of horned pondweed within Masonville Cove ranged in density from 1 to 4. The beds of horned pondweed within the KIM Channel had a density of 1.

Table 1 presents the SAV species and density values observed at the stations where EA observed SAV. While the results of the rake throws were generally consistent within some of the stations with SAV, many of the stations exhibited non-uniformity between rake throws. Table 1 presents an average value of the five raking attempts that took place at each station with SAV in an effort to assign an overall density value for the station. Figure 4 depicts the locations of SAV observations during the June 2006 survey.

August 2006 Survey

The August 2006 survey included all of the stations investigated during the June 2006 survey. No SAV was observed at any of the stations during this survey. In addition, no signs of SAV were observed along the shoreline or floating throughout the study area.

Previous Survey (October 2005)

One species of SAV, Eurasian watermilfoil, was observed growing within the survey area. Filamentous algae were also observed. Eurasian watermilfoil was observed floating within the survey area. The pieces of floating Eurasian watermilfoil were generally small (less than 12 inches long) and were encountered infrequently.

Eurasian watermilfoil was observed growing within the KIM Channel, in the shallow water along the shoreline. Along the western shoreline of the KIM Channel, the beds of Eurasian watermilfoil were approximately 5 feet wide and extended several hundred feet along the edge. Along the southern shoreline of the channel, at the mouth of a culvert, another bed of Eurasian watermilfoil was present. The southeast corner of the KIM Channel supported the largest and densest bed of Eurasian watermilfoil within the survey area. Smaller beds were also present along the eastern shoreline of the KIM Channel. Figure 5 depicts the locations of SAV observed during the October 2005 SAV survey. The beds of Eurasian watermilfoil within the KIM Channel ranged in density from 1 to 3.

Conclusions

SAV has been observed within the study area. Eurasian watermilfoil, a non-native species, was observed within the study area in October 2005. Eurasian watermilfoil was also observed within the study area during the June 2006 survey at 2 of the 109 stations. Horned pondweed, a native species, was observed during the June 2006 survey at 18 of the 109 stations. No SAV observations were made during the August 2006 survey. The absence of SAV during the August 2006 survey may be due to any number of factors including poor water quality, increased turbidity, prolonged weather conditions, etc.

The lack of SAV observations during the August 2006 survey was unexpected; especially since previous observations of SAV within the study area had been made. However, the presence of horned pondweed in June 2006 and the lack of this species in August 2006 is not unexpected, since this species senesces early in the growing season.

SAV presence, density, and species composition within a given site will often vary from season to season. This volatility within the SAV population is usually the result of regional factors rather than local causes. Within the Middle Branch of the Patapsco River, these regional factors include turbidity, presence of pollutants, poor substrate, and continued disturbance from boat traffic and industrial activities.

Recommendations

SAV distribution and abundance often varies from year-to-year and season-to-season. Surveys were conducted in October 2005, June 2006, and August 2006. SAV observations were made in October 2005 and June 2006. Many of the SAV species that may possibly inhabit this region reach peak biomass levels during the summer months (i.e., July, August, September). Since SAV was not observed during the survey conducted during the peak growing season (i.e. August) for many of the SAV species that

could potentially occur within the study area, any future surveys should be conducted during the summer months to confirm that this site does not typically support SAV during the summer.

References

- Hurley, L.M. 1990. *Field Guide to the Submerged Aquatic Vegetation of Chesapeake Bay*. U.S. Fish and Wildlife Service, Chesapeake Bay Estuary Program. Annapolis, MD.
- USFWS. 2002. Adaptation of Braun-Blanquet Scale to Rate SAV Density through Rake Throws. Adapted from Virginia Institute of Marine Science (VIMS) website. June 2004.

**Table 1. Density Results of June 2006 Submerged Aquatic Vegetation Survey,
Masonville DMCF Study Area.**

Station #	Common Name	Scientific Name	Density (0-5)					Average Density of Raking Attempts
			Raking Attempt #					
			1 st	2 nd	3 rd	4 th	5 th	
3	Horned Pondweed	<i>Zannichellia palustris</i>	4	2	2	1	1	2
4	Horned Pondweed	<i>Zannichellia palustris</i>	2	1	0	3	1	1.4
5	Horned Pondweed	<i>Zannichellia palustris</i>	1	1	1	0	2	1
6	Horned Pondweed	<i>Zannichellia palustris</i>	3	3	1	1	1	1.8
8	Horned Pondweed	<i>Zannichellia palustris</i>	2	2	0	0	0	0.8
9	Horned Pondweed	<i>Zannichellia palustris</i>	3	4	3	0	0	2
11	Horned Pondweed and Eurasian watermilfoil	<i>Zannichellia palustris</i> and <i>Myriophyllum spicatum</i>	3	0	0	0	0	0.6

**Table 1. Density Results of June 2006 Submerged Aquatic Vegetation Survey,
Masonville DMCF Study Area (Continued).**

Station #	Common Name	Scientific Name	Density (0-5)					Average Density of Raking Attempts
			Raking Attempt #					
			1 st	2 nd	3 rd	4 th	5 th	
24	Horned Pondweed and Eurasian watermilfoil	<i>Zannichellia palustris</i> and <i>Myriophyllum spicatum</i>	0	1	0	1	0	0.4
25	Horned Pondweed	<i>Zannichellia palustris</i>	1	0	0	0	0	0.2
36	Horned Pondweed	<i>Zannichellia palustris</i>	0	0	0	1	1	0.4
67	Horned Pondweed	<i>Zannichellia palustris</i>	1	1	0	0	0	0.4
73	Horned Pondweed	<i>Zannichellia palustris</i>	0	0	1	0	0	0.2
84	Horned Pondweed	<i>Zannichellia palustris</i>	1	1	1	0	1	0.8
85	Horned Pondweed	<i>Zannichellia palustris</i>	1	1	1	1	0	0.8

**Table 1. Density Results of June 2006 Submerged Aquatic Vegetation Survey,
Masonville DMCF Study Area (Continued).**

Station #	Common Name	Scientific Name	Density (0-5)					Average Density of Raking Attempts
			Raking Attempt #					
			1 st	2 nd	3 rd	4 th	5 th	
86	Horned Pondweed	<i>Zannichellia palustris</i>	0	0	1	1	1	0.6
87	Horned Pondweed and Eurasian watermilfoil	<i>Zannichellia palustris</i> and <i>Myriophyllum spicatum</i>	1	1	1	1	0	0.8
88	Horned Pondweed	<i>Zannichellia palustris</i>	2	2	4	3	1	2.4
89	Horned Pondweed	<i>Zannichellia palustris</i>	4	4	3	3	2	3.2

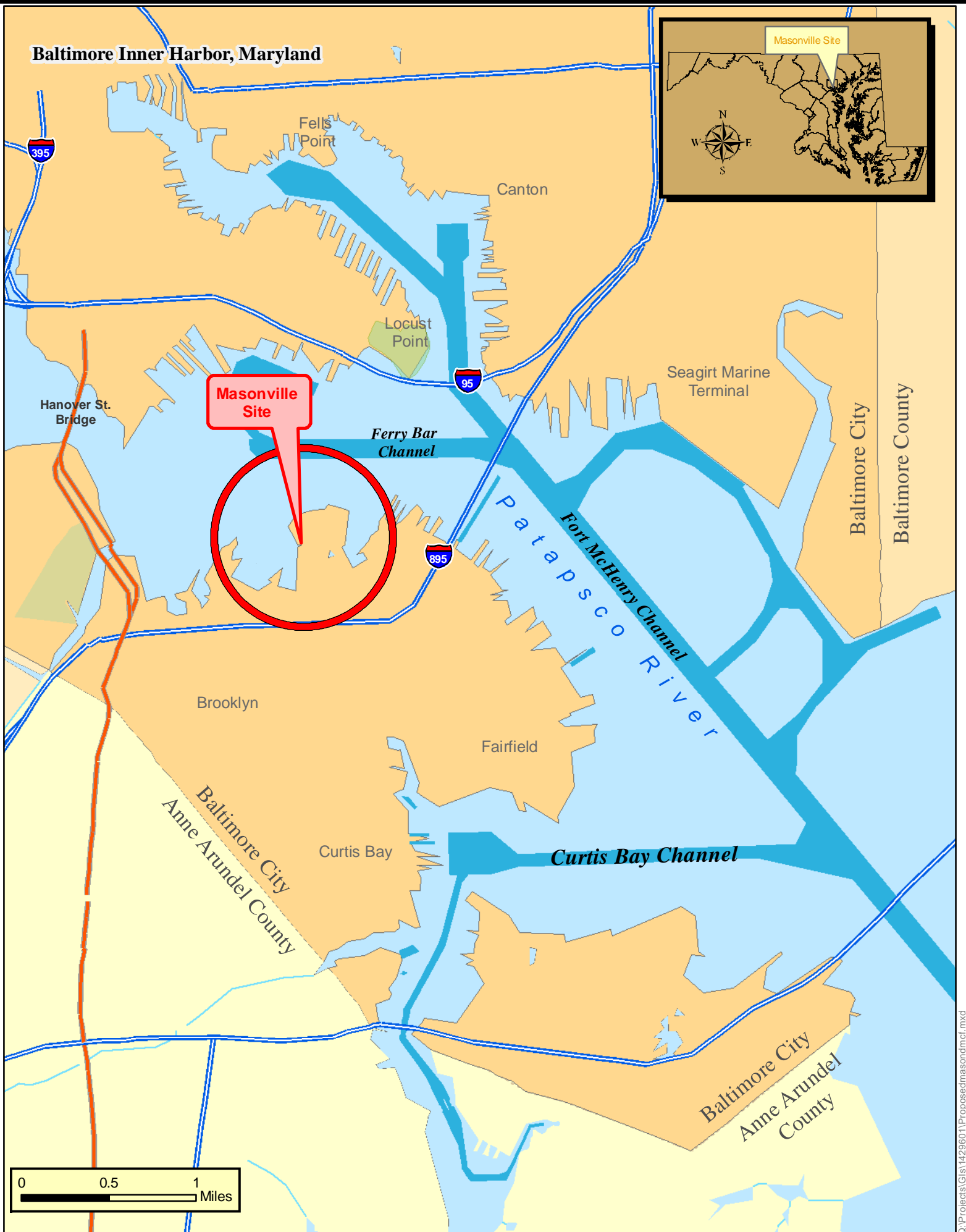


Figure 1. Masonville Location Map

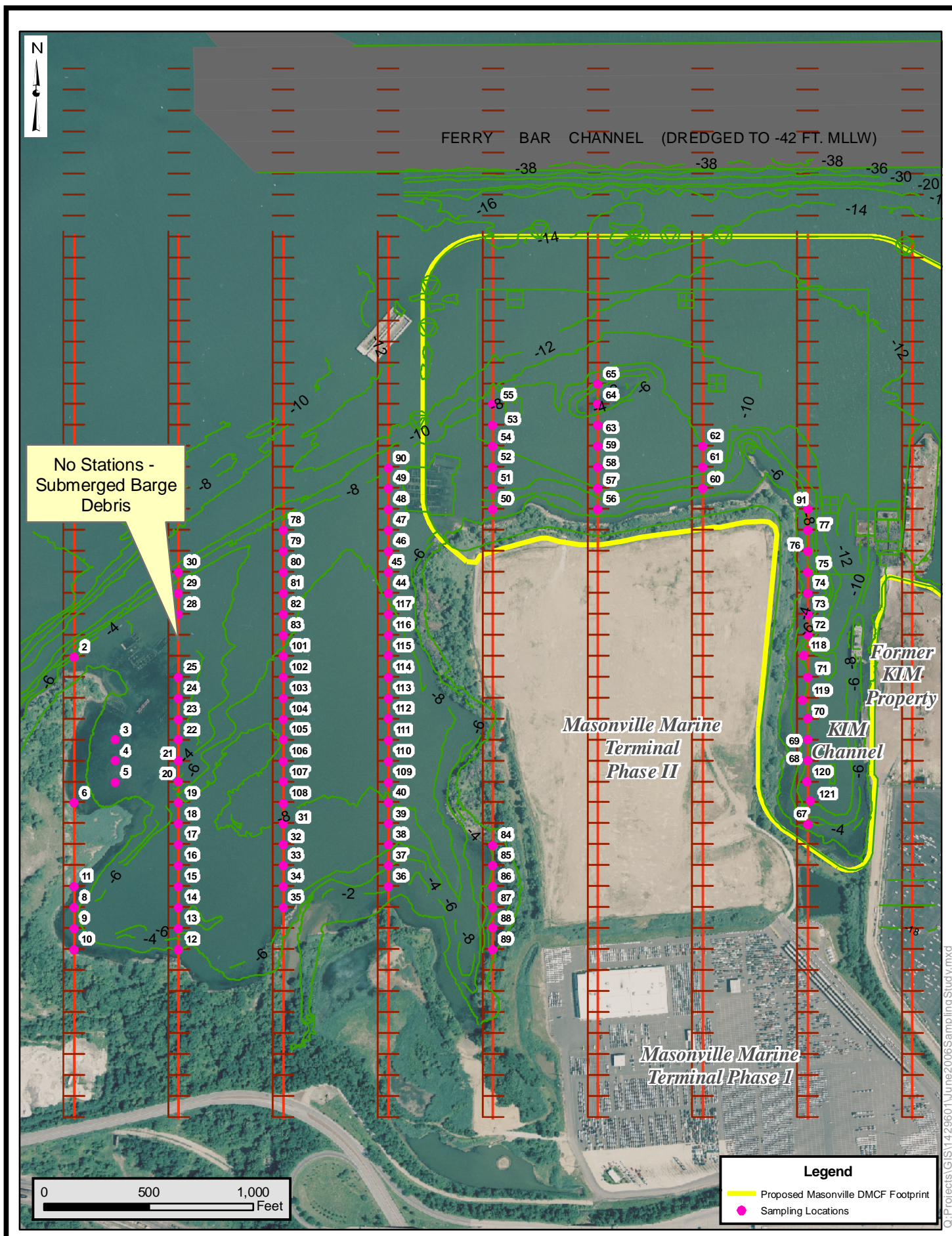
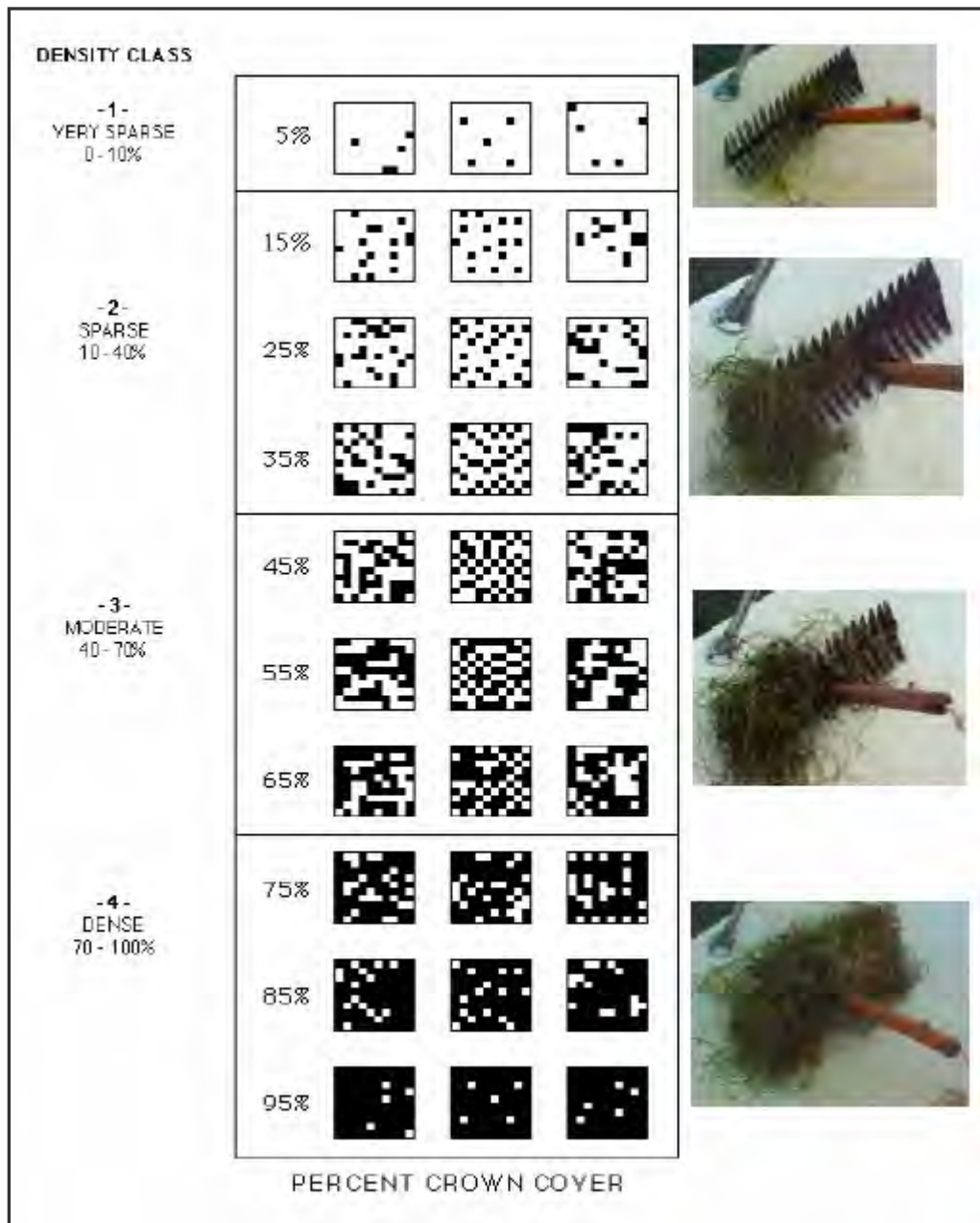


Figure 2. Submerged Aquatic Vegetation Sampling Locations, June and August 2006.



Source: U.S. Fish and Wildlife Service, adapted from Braun-Blanquet scale used to rate SAV density through rake throws, adapted from Virginia Institute of Marine Science (VIMS) website.

Figure 3. Density Classification of Collected SAV

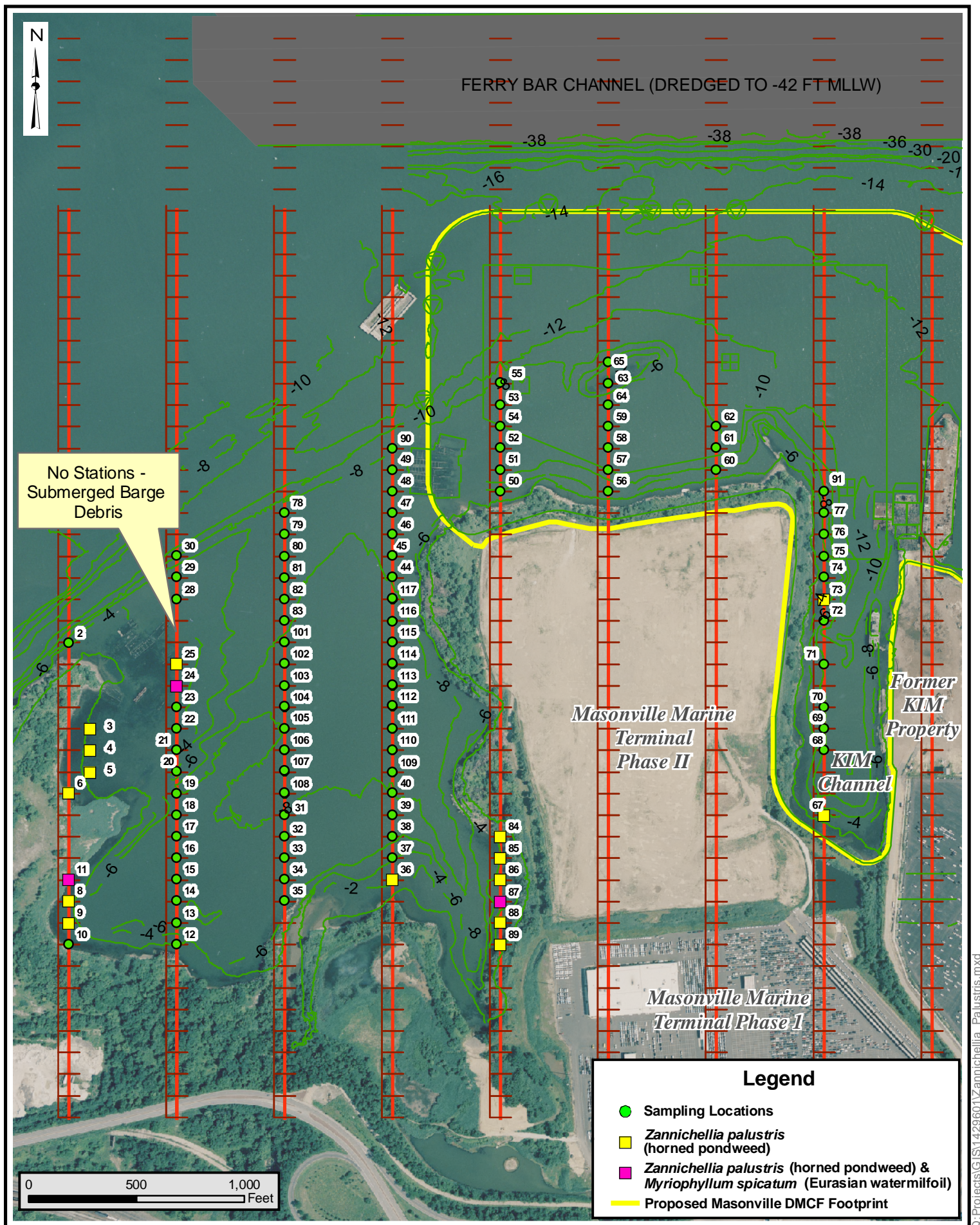


Figure 4. Location of Submerged Aquatic Vegetation Observed, June 2006.

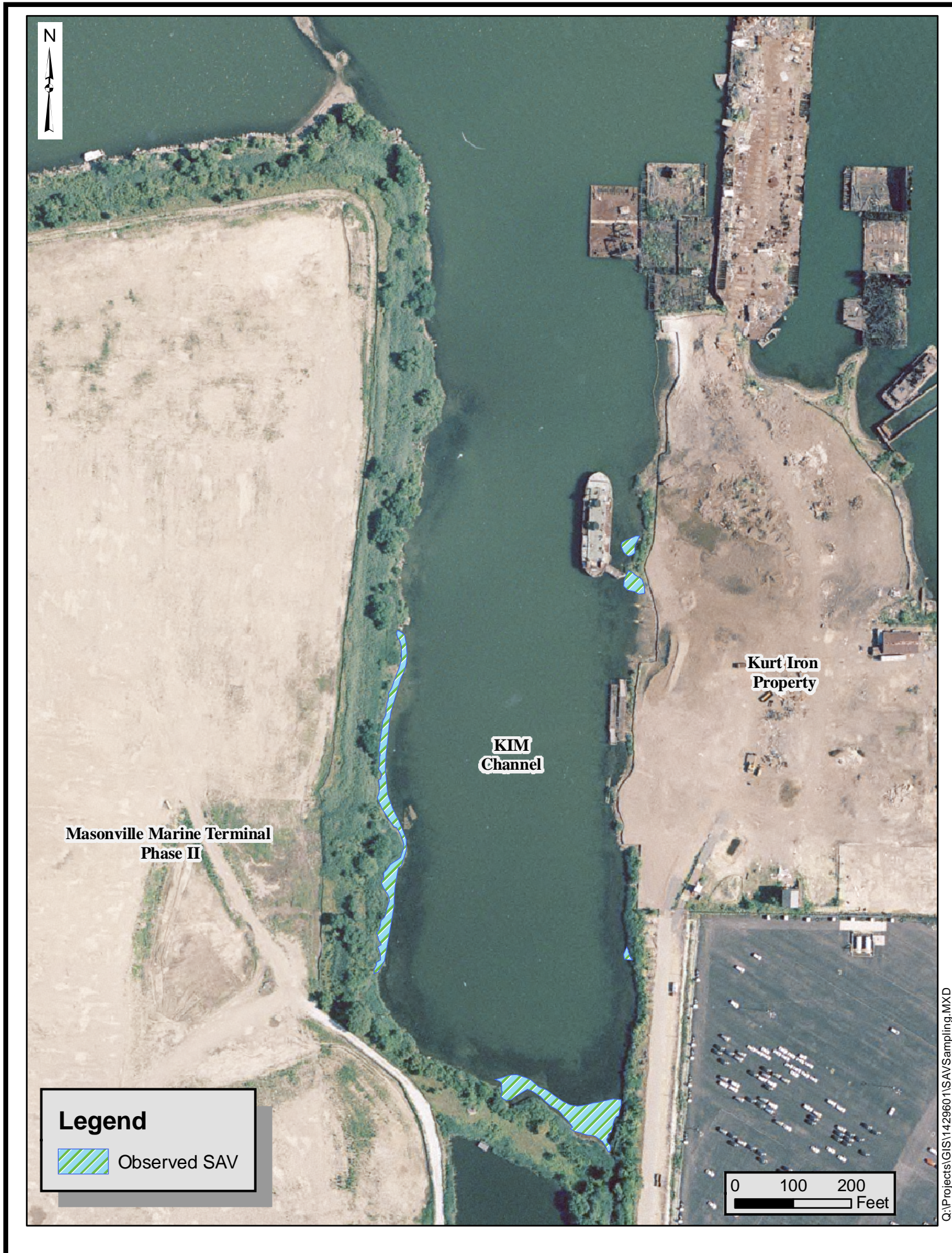


Figure 5. Location of Submerged Aquatic Vegetation Observed, October 2005.

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